MAP 8 - 5

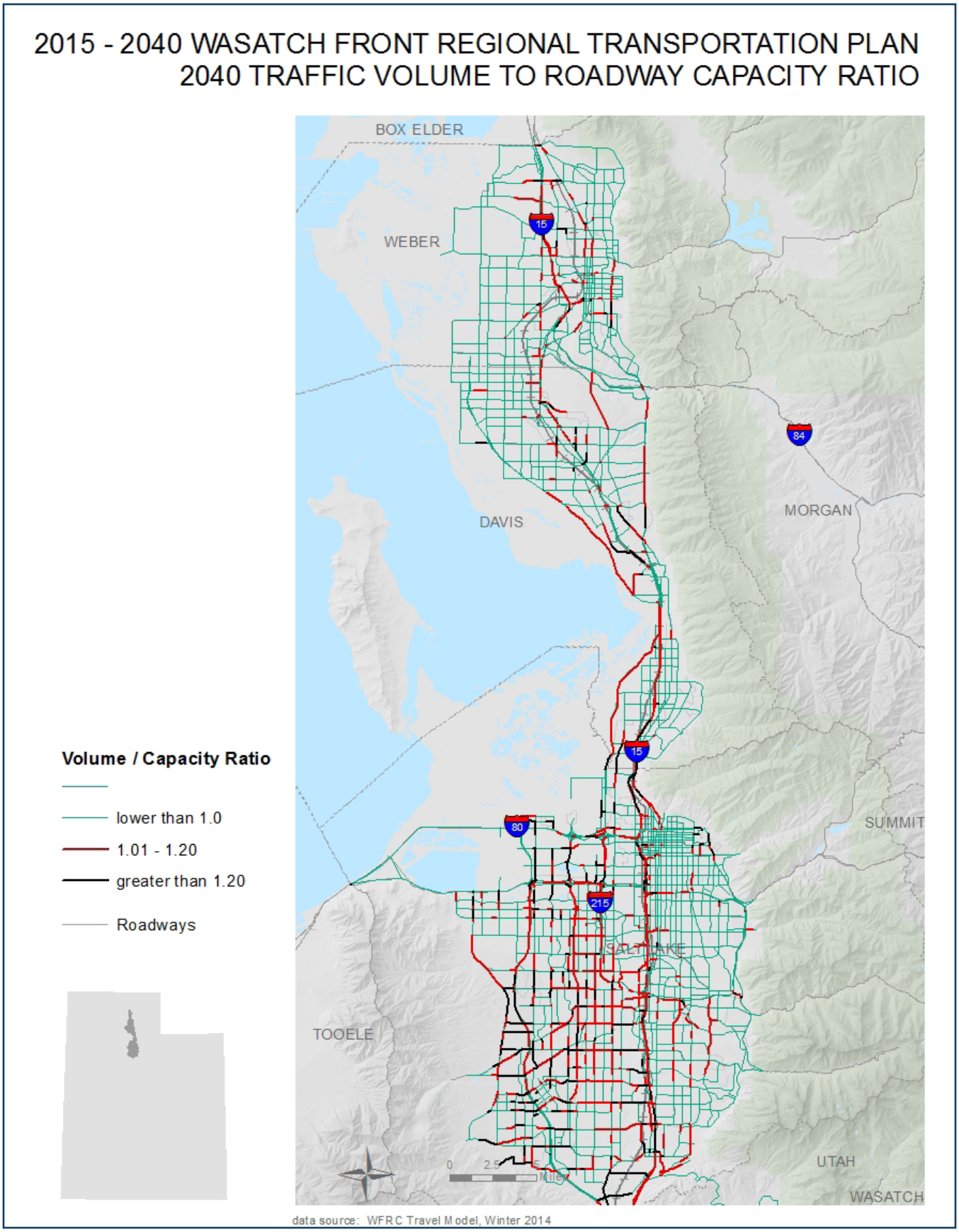

2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
2040 TRAFFIC VOLUME TO ROADWAY CAPACITY RATIO
BOX ELDER
WEBER
DAVIS
MORGAN
SUMMIT
SALT LAKE
TOOELE
UTAH
WASATCH
15
84
80
215
Volume / Capacity Ratio
lower than 1.0
1.01 - 1.20
greater than 1.20
Roadways
0
2.5
Miles
data source: WFRC Travel Model, Winter 2014

FIGURE 8 - 12 WASATCH FRONT REGION VEHICLE EMISSION TRENDS–NOX

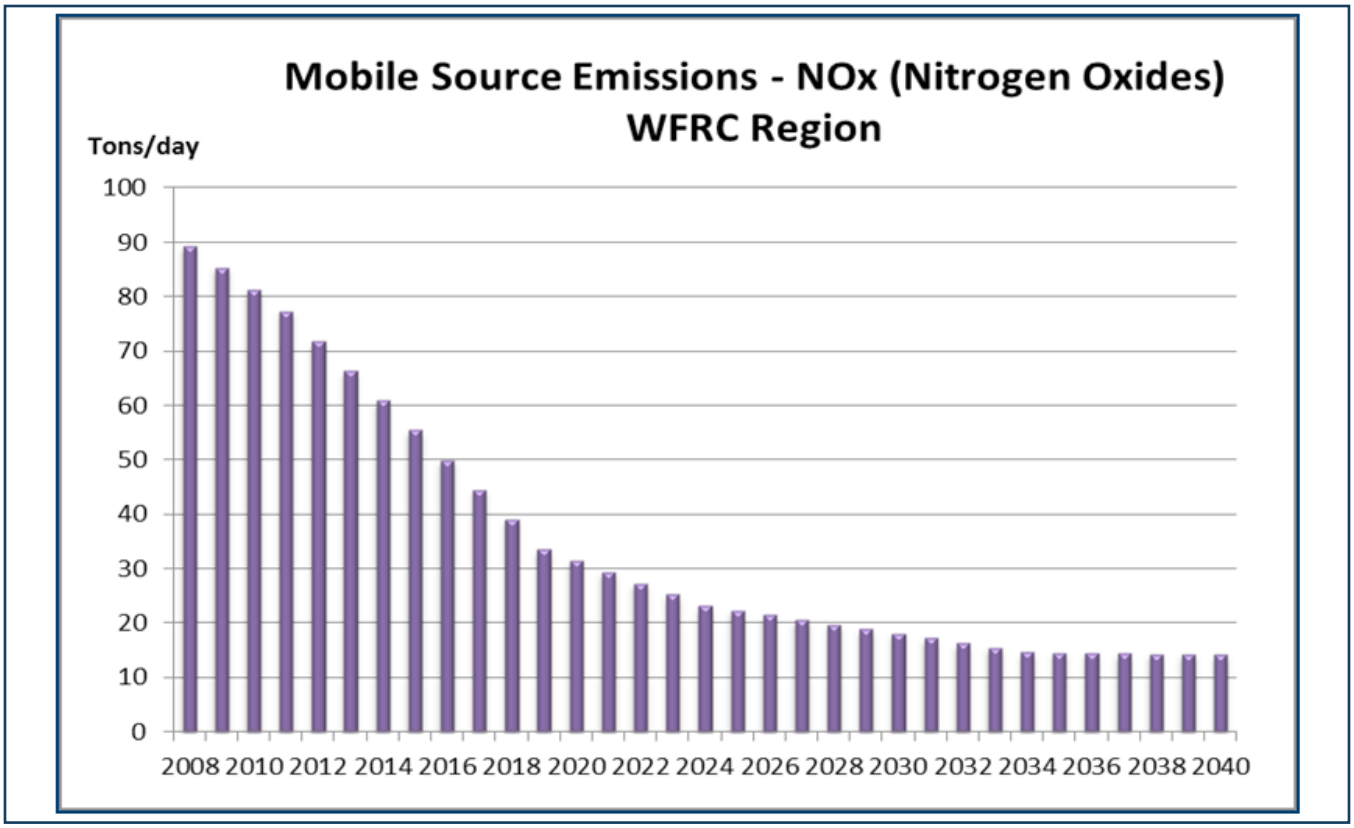


FIGURE 8 - 13 WASATCH FRONT REGION VEHICLE EMISSION TRENDS–CO

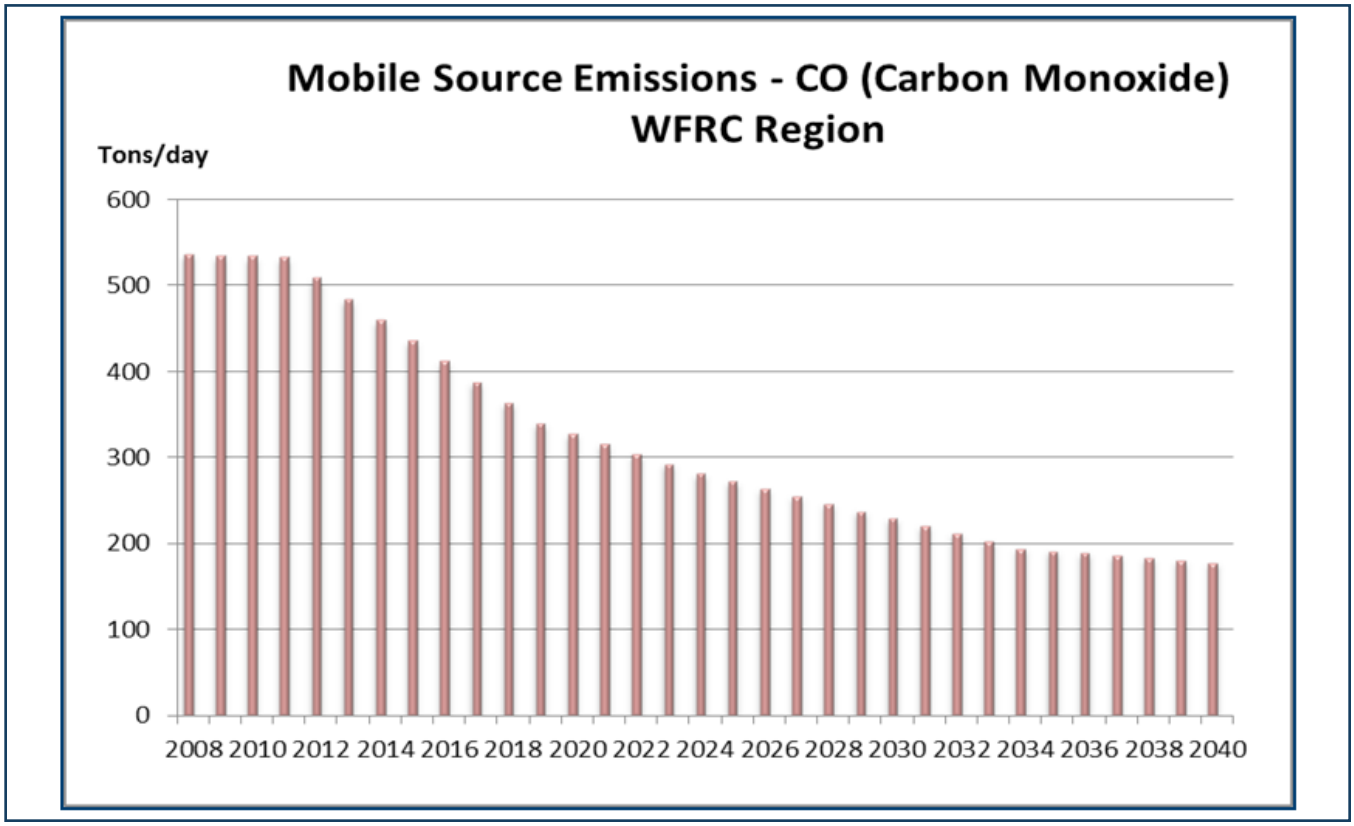
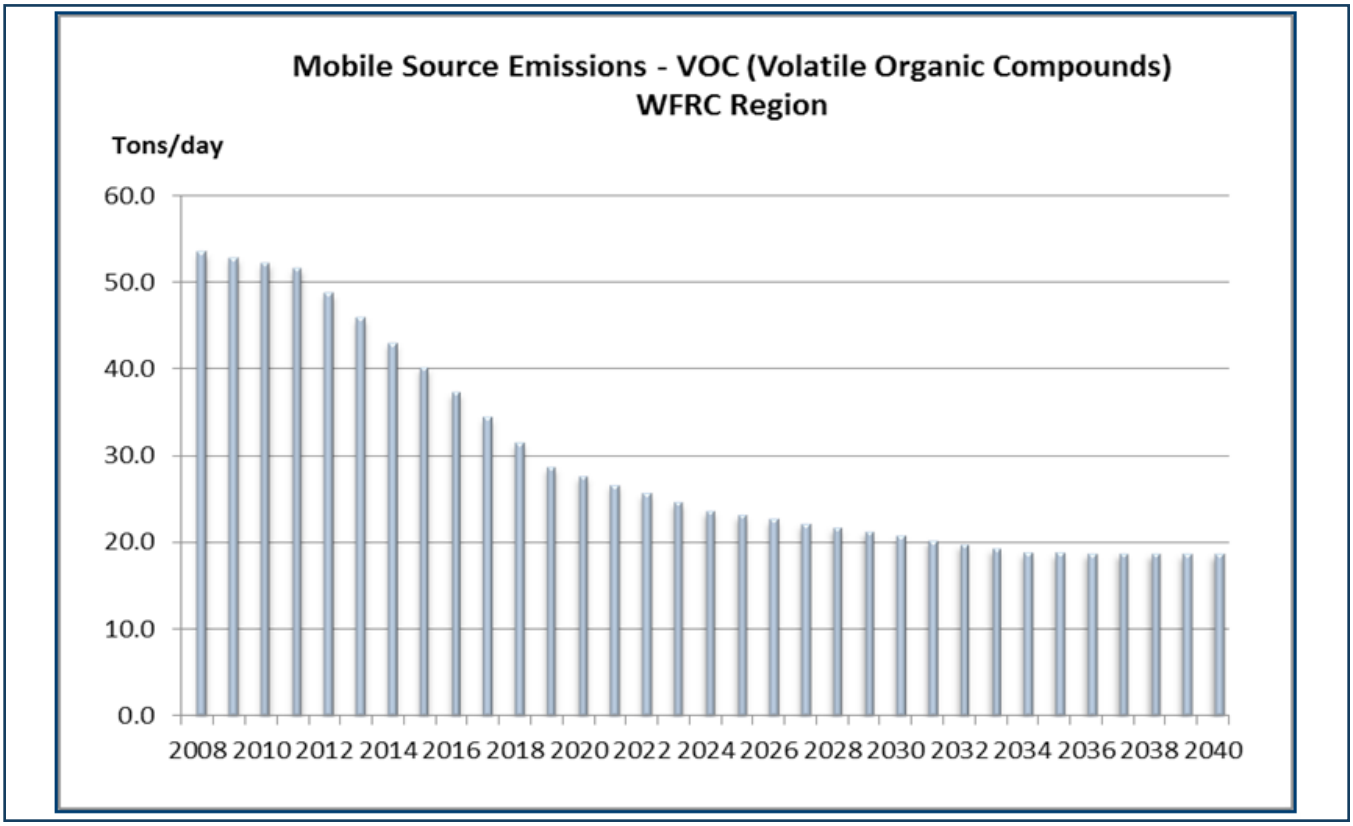


FIGURE 8 - 14 WASATCH FRONT REGION VEHICLE EMISSION TRENDS–VOC



Air Quality

Emissions from cars and trucks traveling on public highways have been declining since the 1990's, even with increases in the overall amount of vehicle travel. This trend in emissions for the Wasatch Front Region (Weber, Davis, Salt Lake, Box Elder, and Tooele Counties) is depicted graphically in **Figures 8-12, 8-13, and 8-14**. The emission reduction from vehicles can be attributed mainly to substantial improvements in vehicle emission technology required by federal vehicle standards. Local emission testing and repair programs have also played a lesser but important role in monitoring and reducing overall vehicle emissions.

In the future time frame of the 2015 – 2040 RTP, as newer vehicles with the latest emission technology replace older vehicles, overall emissions will continue to decrease. In 2004, Tier 2 vehicle emission standards for cars and light trucks were implemented, resulting in elimination of over 85 percent of emissions as compared to vehicles manufactured in the 1970's. In 2017, Tier 3 vehicle emission standards will take effect and will significantly reduce vehicle emission yet again. In addition, large diesel trucks beginning with model year 2007 are now subject to much stricter emission standards

TABLE 8 - 5 RTP EMISSION REDUCTIONS IN 2040

RTP IMPROVEMENTS	VEHICLE TRIPS OR HOURS REDUCED	VMT REDUCED	2040 EMISSION REDUCITONS (TONS/DAY)		
			CO	NOx	VOC
Transit	165,200 trips	1,321,600	12.21	0.22	0.28
Non-motorized Trips	708,500 trips	1,062,800	38.95	0.53	0.73
Traffic Operations*	71,500 hours	178,500	1.07	0.13	0.03
Total	--	--	52.23	0.88	1.04

**traffic operation improvements do not eliminate vehicle starts*

than in the past. Reduced diesel emissions will contribute significantly to an overall decrease in future vehicle emissions.

Other contributing factors to reduced future vehicle emissions include the 2015 – 2040 RTP recommendations for expanded transit service and highway improvements strategically planned to alleviate congestion and corresponding emissions. Congested traffic is responsible for excess emissions for two reasons: (1) the additional load to vehicle engines operating in stop and go conditions; and (2) the inefficiency of congested traffic that generates emissions but produces no movement of people or goods. **Table 8-4** in the Energy Analysis section of this document estimates that by 2040, transit projects and non-motorized trips will eliminate approximately 873,700 daily vehicle trips, which is the equivalent of about 2,384,400 vehicle miles each day. In addition, highway improvements are estimated to potentially eliminate 71,500 daily vehicle hours of travel. As shown in the **Table 8-5**, these reductions in congestion and delay amount to reductions of CO, NOx, and VOC emissions of about 52.23, 0.88, and 1.04 tons per day respectively in 2040 due to transportation improvements described in the 2015 – 2040 RTP.

Much of the Wasatch Front Urbanized Area has been designated as a non-attainment area by the Environmental Protection Agency for certain types of air borne pollutants: carbon monoxide, coarse particulate matter (PM10), fine particulate matter (PM2.5), and potentially ozone. While vehicle emissions are decreasing dramatically, exhaust emissions from automobiles, trucks, and buses in the form of carbon monoxide (CO), nitrogen oxides (NOx), and volatile organic compounds (VOC) remain a significant source of the air pollution problem in the Wasatch Front region. The impact of the 2015 – 2040 RTP on emissions of each of the mobile source related pollutants was examined and evaluated. The WFRC determined that the 2015 – 2040 RTP is consistent with and conforms to state air quality plans. For more information on air quality, please refer to the Air Quality Memorandum Report Number 32.

TABLE 8 - 6 SALT LAKE–WEST VALLEY URBANIZED AREA PROJECTS WITH POTENTIAL NOISE IMPACTS

STREET	FROM	TO
I-80	1300 East	Parley's Canyon
SR-201	I-15	I-80
3500 South	4000 West	8400 West
4500 South	Highland Drive	900 East
4700 South	2700 West	5600 West
5400 South	4800 West	SR-111
6200 South	Redwood Road	SR-111
Fort Union Blvd.	1300 East	3000 East
7000 South	Redwood Road	Bangerter Highway
7800 South	Airport Road	SR-111
8000 South	Bangerter Highway	New Bingham Highway
10400 South	Redwood Road	Bangerter Highway
11400South / 11800 South	Bangerter Highway	SR-111
12600 South	Bangerter Highway	Mountain View Corridor
13400 South	Bangerter Highway	Mountain View Corridor
6400 West	12600 South	13400 South
Mountain View Corridor	I-80	Utah County Line
5600 West	4400 South	14400 South
Redwood Road	8000 South	Bangerter Highway
Main Street	3300 South	Vine Street
700 East	Carnation Drive	12300 South
900 East	3300 South	Fort Union Blvd.
Highland Drive	8400 South	13800 South

Noise

Roadway noise impacts vary, based on traffic, the nature of the road, and adjacent land use characteristics. Relevant traffic characteristics are volume, speed, and vehicle mix. The roadway characteristics affecting noise include grades and the presence or absence of noise barriers. Also important are adjacent land use characteristics, including the noise sensitivity of adjacent land uses, the distance between the roadway and the land use, and the design and construction of affected buildings.

A majority of projects in the 2015 – 2040 RTP will have relatively minor or no impact on existing developed areas. However, the projects listed in **Tables 8-6 and 8-7**, primarily interstate highways and principal and minor arterials, have the greatest potential for noise impacts on adjacent communities. These roads pass through identified residential areas and are relatively high-speed, high-volume facilities.

Mitigation - Specific project noise impact assessments and mitigation measures will be determined during project design. Noise effects may be mitigated by shifting the highway alignment away from noise sensitive land uses, depressing the roadway, or installing noise barriers between the highway and the sensitive areas. In addition to the highway projects, light rail and commuter transit systems also have the potential for noise impacts. Noise barriers are most frequently incorporated into limited access highways. Noise mitigation is less effective or not effective for non-limited access, since land access roads, such as driveways, would largely negate mitigation efforts. As a matter of UDOT policy, noise mitigation measures will not be incorporated into certain sections of these projects where proposed development has not been approved by the local government authorities at the time highway facilities are under construction. Therefore, the affected local governments should require developers to consider the noise effects of existing adjacent and planned highway facilities during the development approval process. These

TABLE 8 - 7 OGDEN–LAYTON URBANIZED AREA PROJECTS WITH POTENTIAL NOISE IMPACTS

STREET	FROM	TO
1800 North (Clinton)	Main Street	West Davis Highway
200 South	500 West	West Davis Highway
Syracuse Road (SR-108 / 127)	1000 West	West Davis Highway
Hill Field Road Extension	2200 West	3650 West
700 South / 200 South (Clearfield)	I-15	2700 West
Antelope Drive	Oak Forest Drive	US-89
500 South (West Bountiful)	I-15	Redwood Road
West Davis Corridor	Weber Co. Line	I-15 / US-89
2000 West	Weber Co. Line	Syracuse Road
2700 West	Hill Field Road Extension	North Legacy Corridor
US-89	I-15 (Farmington)	I-84
Skyline Drive (North)	2600 North	US-89
2600 North / 2700 North	I-15	3500 West
Midland Drive	Hinckley Drive	3500 West (Roy)
5600 South	1800 West	3500 West
5600 South / 5500 South	3500 West	5800 West
North Legacy Corridor	Davis County Line	I-15
3500 West	1200 South	Weber Co. Line
Monroe Boulevard	1300 North	2700 North

considerations include proper setback distances from the noise source, and walls or berms between the noise source and receptor.

Water Quality

The National Clean Water Act, the State's Non-point Source Management Plan, and various other governmental regulations require the monitoring of water resource impacts and management in the urbanized areas. Water quality impacts resulting from a highway improvement project generally depend on traffic volumes, pavement width additions, and the aquifer recharge capability of the surrounding soils. Water quality is affected by oil and other hazardous materials deposited by vehicles on the roadway and subsequently washed into ground water or open bodies of water. The amount of pavement added roughly correlates with increased road salt and other solvents used during the winter months. The aquifer recharge capability of the soils surrounding the project and the project's proximity to a well recharge area is indicative of the likelihood of roadway runoff contaminating drinking water. The 2015 – 2040 RTP is expected to require approximately 17,000 acres of right-of-way in ground water recharge zones and an additional 1,500 acres in close proximity to surface water and potential wetlands.

Mitigation - Specific project water quality impact assessments will be made, and mitigation measures based on best management practices will be determined during the environmental phase of the individual project development process. During project design, settling ponds or storm water removal facilities may be used to limit the introduction of hazardous material seepage into important aquifers. **Map 8-6** shows the surface water features located within the Wasatch Front Urban Area.

Wetlands

Wetlands are areas able to support vegetation adapted for life in water- saturated soils. Wetlands can be generally defined as vegetated aquatic areas, such as bogs, marshes, swamps, and prairie potholes. Jurisdictional wetlands are those wetlands, which are within the extent of the Corps of Engineers' regulatory overview. Large, intact wetlands serve critical environmental functions, including flood control, water purification, and the provision of habitat for fish and wildlife. The significance of roadway wetland impacts varies, based on wetland characteristics such as the size of the wetlands area, the level to which the wetlands have already been disturbed by human development, and jurisdictional status. A project may impact wetlands by providing a barrier between adjacent wetland areas or by encroaching upon a single wetland area.

The projects in the 2015 – 2040 RTP that were deemed to have potential impacts on wetlands were those involving new construction or a widening of two or more lanes, and that would traverse, or be in close proximity to, the wetlands identified by the U.S. Fish and Wildlife Service's National Wetlands Inventory. The National Wetlands Inventory, which is based on aerial photography and did not include site sampling, includes both jurisdictional and non-jurisdictional wetlands in Utah and throughout the United States. The degree of impact for the projects listed as potentially affecting wetlands will depend on the amount of right-of-way required. Thus, projects requiring a considerable amount of right-of-way would have more impact than those requiring minimal or no new right-of-way.

Mitigation – Regarding the projects included in the 2015 – 2040 RTP, consideration should first be given to impact avoidance. Specific jurisdictional wetland impact assessments will be made during the project development stage, and mitigation measures will be determined during the environmental evaluation and review phase. Strategies to mitigate impacts to wetlands should include: avoidance by shifting the alignment away from wetlands, replacing lost wetlands, banking wetlands, and / or using "no access" lines to restrict accompanying land development. Potential wetland areas within the Wasatch Front Urban Area are shown on **Map 8-7**. It should be noted that Murray City in Salt Lake County designed a project, as I-215 was constructed, to direct storm water run-off from the freeway into identified wetlands next to the Jordan River. Water filtered through these wetlands is collected and used to irrigate a nearby golf course and other park areas. Murray City has received national recognition for this project.

Farmland

The 2015 – 2040 RTP's recommended improvements will impact farmland by acquiring rights-of-way through active agricultural areas. In the urbanized areas, much of the prime farmland and farmland of statewide importance has already been developed, or is planned for urban uses. Examples of this are properties in Salt Lake County located between SR-111 on the west and the Union Pacific Railroad tracks on the east. These areas were designated in 1978 as prime farmland or farmland of statewide importance. In southern Davis County, a 1978 Soil Conservation Service map designated much of

Centerville, west Farmington, and parts of West Bountiful as prime agricultural land. Much of this land has been, or is under consideration for development. In Weber County, a considerable amount of the prime agricultural land is located between I-15 and the wetlands of the Great Salt Lake. Much of this land has already been converted to urban use, and the agricultural lands that remain are currently under substantial development pressure. In both Weber and Davis Counties, several farms have received the designation "Agricultural Protection Zones" which gives the land special status and makes it more difficult for local and state governments to use condemnation procedures to acquire property for a public purpose.

Prime farmlands of the Wasatch Front are generally those with relatively high quality soils, reliable water, and fewer than 30 dwelling units per 40-acre area, which are not currently designated for urban use. Lands currently within a municipality, which are used, but not zoned for agricultural or open space preservation, are presumed to be urban or designated for future urban use.

With the exception of new roadway construction and rights-of-way acquisition projects, the extent of direct impacts by the 2015 – 2040 RTP improvements on farmlands is relatively minor. New roadways often require larger amounts of rights-of-way than past projects and have the potential for greater direct impacts on farmland. Also, new roadways have the indirect impact of making nearby farmlands more attractive for urban land uses.

Farmland in Salt Lake County, has over the years, been largely consumed by urban development. Forty or more years ago, there were still large tracts of land in agricultural use, particularly in the southwestern part of Salt Lake County. Today, much of that farmland has been converted to residential and other uses, and the balance has been planned for urban development. Farmland that remains in Salt Lake is mostly destined for development, since there are no local government policies in place that would specifically provide for the preservation of farmland.

There are some parcels in Salt Lake County that are used for pasture, growing of hay, and turf farming. The communities that still have significant agricultural lands are Herriman, Bluffdale, West Jordan, and Salt Lake City. In Salt Lake City, there are several parcels of farmland on the west side, and in the Northwest Quadrant.

Most of Davis County's remaining farmlands are located west of the West Davis Highway, or west of Bluff Road. Davis County's farmland has also been largely converted to urban uses, similar to the pattern of Salt Lake County.

Weber County, of the three urbanized counties, has the most remaining farmlands. Most of this farmland is located in western Weber County, west of 1900 West, between the communities of Roy and Plain City. There are still large tracts of land that produce a variety of crops, including hay, corn, and onions. There is also a considerable amount of pastureland, as well as a few dairy operations in the area. A number of farmers have expressed a desire to continue to farm the land as long as possible. They do not welcome urbanization and the construction of transportation infrastructure through the area. The 2015 – 2040 RTP is estimated to directly impact 46 acres of Agricultural Protection Area and an additional 953 acres of agricultural land.

Mitigation – Farmlands which have been officially designated as part of an "Agricultural Protection Zone", along with other productive farmlands in the Region, need to be avoided. If avoidance is impossible, due to the absence of other reasonable alternatives, care should be taken in the planning of the transportation facilities to limit the disruption of farm operations to the least extent possible. Local government planning and zoning regulations can play a vital role in preserving viable farmlands.

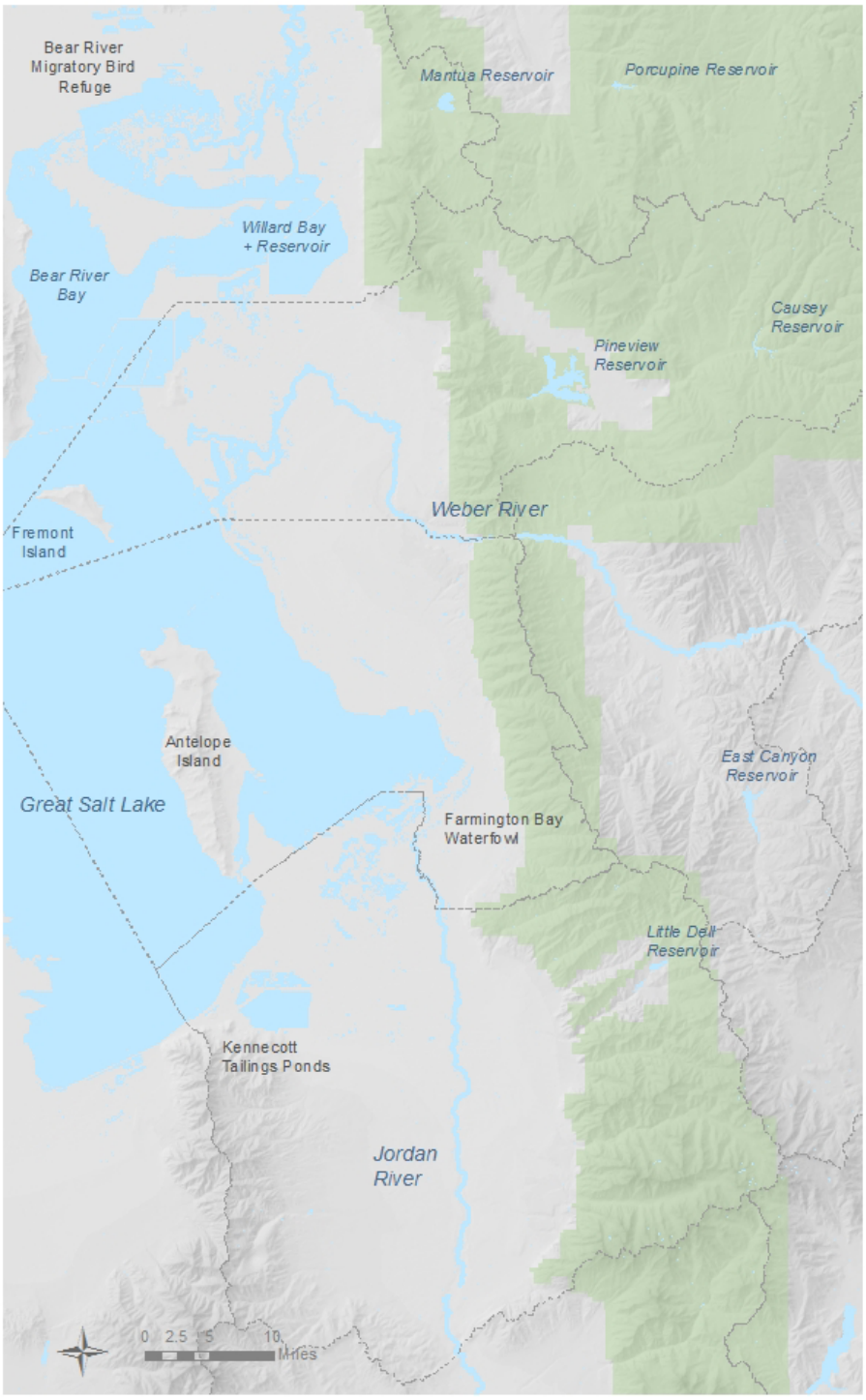
Wildlife Habitat / Sensitive Species

The 2015 – 2040 RTP was evaluated to determine potential impacts on wildlife habitat and endangered and threatened species known to exist in Salt Lake, Davis, and Weber Counties. Bald eagles are known to feed near the Great Salt Lake. The proposed West Davis Highway could possibly affect this habitat. Endangered and threatened plants include Ute Ladies'-tresses and Deseret Milkvetch. It is not known if these plants and animals would be adversely impacted by projects listed in the 2015 – 2040 RTP. A survey of sensitive species will be conducted during the Environmental Impact Statement phase of project development.

The three urbanized counties represented by the WFRC contain significant wildlife habitat areas for a variety of species. The Great Salt Lake and associated wetlands provide an internationally significant migratory bird habitat. Many streams provide habitat for fish, mammals, reptile, and amphibian habitats. A portion of the foothills have been converted for urban use, which interfaces with the native grass, sage, and scrub oak-covered habitat. Mule deer, elk, mink, and snowshoe hare winter and at times spend their entire life cycles in these areas. Also, several species of birds use the foothills for year-round

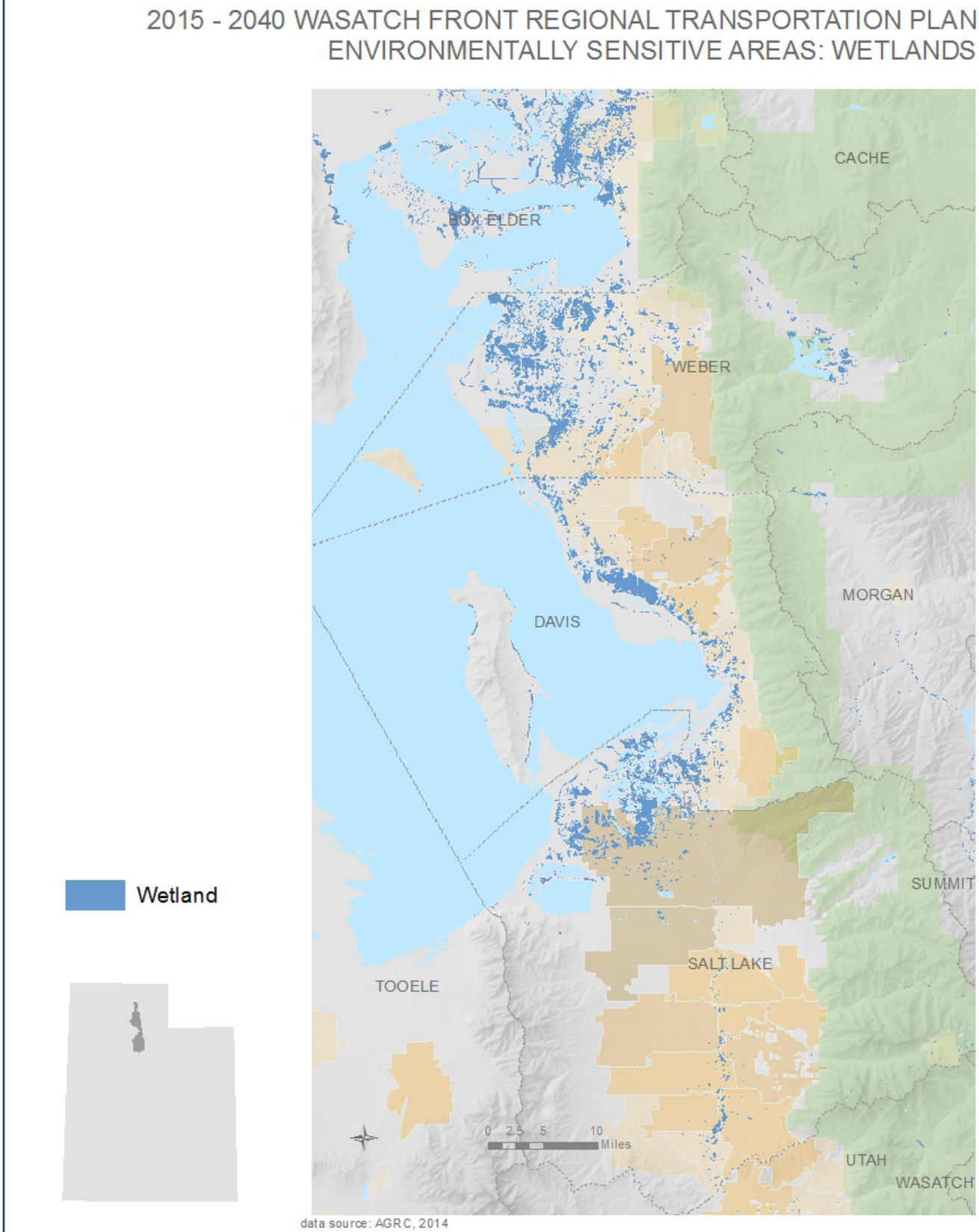
MAP 8 - 6

2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
SURFACE WATER



data source: AGRC, 2014

MAP 8 - 7


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
ENVIRONMENTALLY SENSITIVE AREAS: WETLANDS
CACHE
BOX ELDER
WEBER
MORGAN
DAVIS
SUMMIT
SALT LAKE
TOOELE
UTAH
WASATCH
0 2.5 5 10
Miles
Wetland
data source: AGRC, 2014

habitat, such as the California Quail, Ring Neck Pheasant, and Ruffed Grouse.

Mitigation - The best method of mitigation is avoidance. If this is not possible, then plans are needed to minimize and / or mitigate unavoidable impacts. There are a variety of measures that can be taken, such as providing wildlife corridors if a transportation facility creates a barrier to wildlife movement or migration. It will be important to coordinate very closely with the U.S. Fish and Wildlife Service and the Utah Department of Wildlife Resources during the various phases of project development.

Water Body / Floodplain Modification

Natural water bodies and floodplains help to moderate flooding and accommodate erosion in a river. Projects can impact a water body by disturbing ground within 20 feet of natural or semi-natural rivers and streams, realigning or channeling meandering waterways, placing obstructions in floodplains, and utilizing unstable floodplain crossings.

The Army Corps of Engineers District Office has indicated in the past that the Jordan River in Salt Lake County was of particular concern, and urged that new crossings of the river be avoided, or minimized whenever possible. One project in the 2015 – 2040 RTP that will particularly affect the Jordan River is Porter Rockwell Blvd. This project will necessitate the construction of bridges. The numerous smaller streams flowing from the surrounding mountains were not considered in the evaluation, as they will be evaluated at a later time in more detail during the Environmental Impact Statement phase of project development. **Map 8-6** shows the distribution of surface water bodies within the Wasatch Front Region.

Mitigation - Transportation facilities should, wherever possible, avoid floodplains. If a project must be located in an area designated as a floodplain, the facility will need to have the proper vertical elevation to prevent flooding. As a way to mitigate the natural hazard of flooding, alternative routes should be identified if the project is determined to be essential to the Region's overall transportation network. Stream crossing should be at right angles to minimize impacts. The channelization of streams and rivers should be minimized or avoided so that the natural channel and the habitat it provides can be preserved. If a watershed management plan exists for an area under consideration for a project, care should be taken to carefully coordinate efforts with watershed planners. Lastly, pre-construction meetings should be held with public officials, contractors, and others to discuss floodplain protection and how the project can be best designed to maintain natural drainage patterns and any existing runoff measures.

Hazardous Waste

The potential for the discovering of hazardous waste deposits buried in project rights-of-way is a concern. The purchase of a contaminated site, or possibly even the purchase of property sub-divided from a contaminated parcel, may result in the public agency that purchased the property becoming financially liable for a hazardous waste site clean-up process. This liability, if it falls to the transportation agency, could create significant financial burdens and project delays.

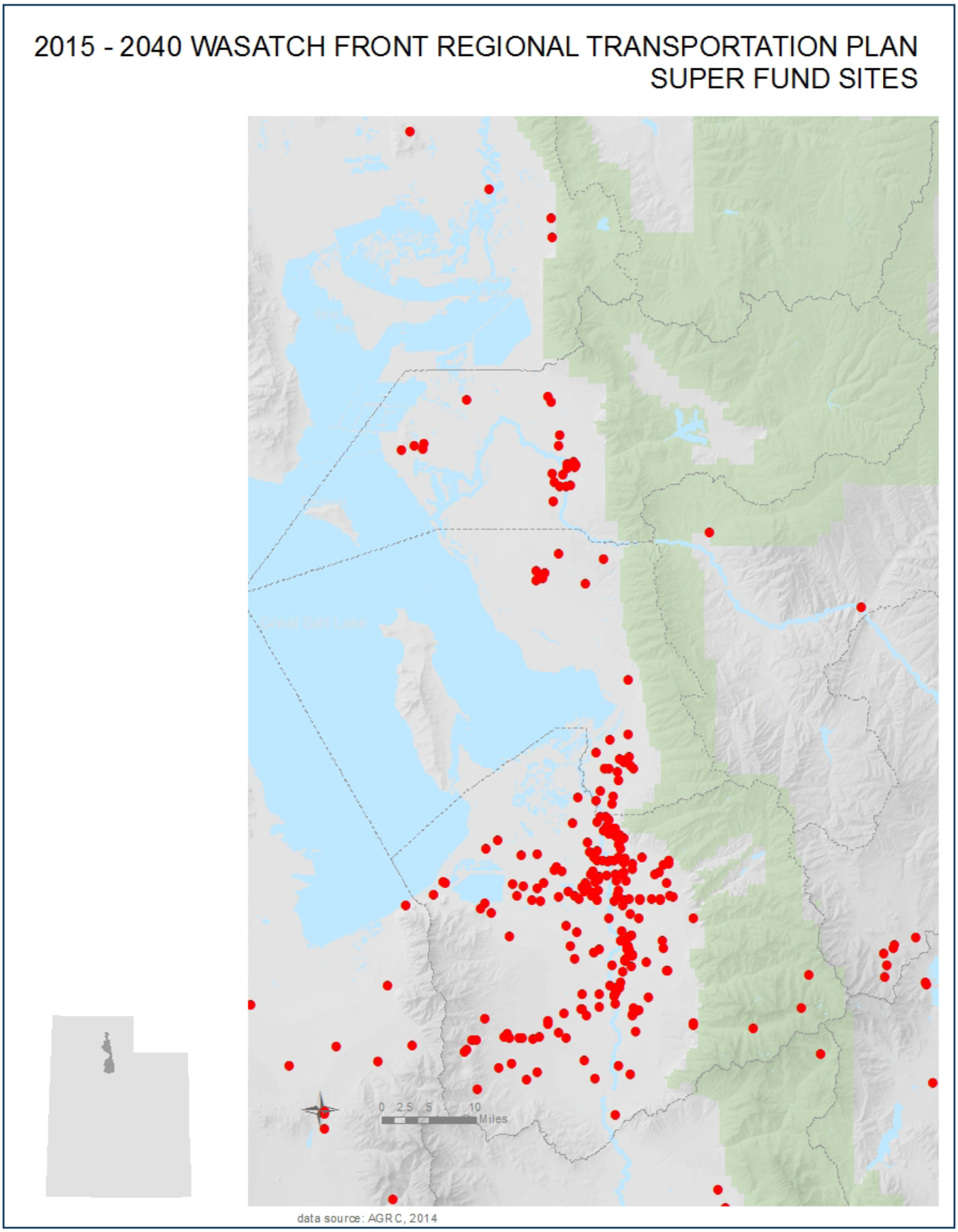
To identify projects that could be affected by hazardous waste sites, WFRC compared the location of proposed 2015 – 2040 RTP projects with the location of "Superfund" sites listed in the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS). CERCLIS is the database used by the EPA to track the status of potential and confirmed hazardous waste sites. (Inclusion in CERCLIS simply means EPA has been notified of the possibility of some release of hazardous substance to the environment, thereby triggering the need for a preliminary assessment.) The distribution of CERCLIS National Priority List Superfund Sites is shown in **Map 8-8**.

Besides the National Priority List Superfund Sites for the three urbanized counties of the Wasatch Front Region noted above, there are between one and two hundred other CERCLIS sites that have the potential of becoming EPA Superfund Sites. It has not been determined definitively that the sites are contaminated, but that there is the potential that they may be. These sites have been identified and mapped by the Utah State Department of Environmental Quality (DEQ), Division of Environmental Response & Remediation (DERR). The database and map should be consulted prior to, or during the EIS preparation phase of project development.

The 2015 – 2040 RTP projects are in immediate proximity of approximately 5,000 acres of hazardous waste sites. Additionally, there are an additional 49 acres of solid waste disposal sites that are impacted.

Mitigation – The existence of hazardous waste or Superfund sites could significantly affect the feasibility of a transportation projects. Disturbance of a site could present a significant hazard and could cost

MAP 8 - 8


2015 - 2040 WASATCH FRONT REGIONAL TRANSPORTATION PLAN
SUPER FUND SITES
Great Salt Lake
0 2.5 5 10
Miles
data source: AGRC, 2014

millions of dollars to mitigate before construction of a transportation project could begin. Therefore, it is very important for transportation agencies to be aware of where these sites are located so that decisions about the proposed transportation facility can be made in light of this information. It may be prudent to avoid hazardous waste sites if added costs and adherence to construction schedules are important. On the other hand, while increasing costs, a transportation project can be the catalyst for removing a negative environmental condition and spur further mitigation of property for development. Planning for the possible mitigation and use of sites impacted by hazardous waste for transportation projects and other infrastructure should involve the closest possible collaboration with local planning authorities, current property owners, and other community representatives.

Geologic Hazards

It is important to consider geologic and other physical constraints when evaluating transportation projects. In this case, the concern is not only what impacts transportation projects may have on the environment, but what impacts the sensitive environmental features may have on the projects and the safety of the people who will use them. The geologic hazards chosen for this evaluation were: (1) Steep slopes; (2) faults; and (3) liquefaction potential. Steep slopes present a host of problems to transportation projects, including slope failure due to water saturation of soils, which greatly increase maintenance costs. Faults are problematic from the standpoint of potential movement along a fault line.

Such slippage due to earthquakes could range from "gradual" to "catastrophic". In any case, building on a fault line is risky and should be avoided. Liquefaction is associated with fine soils or clays that are not well drained. They can become highly unstable during an earthquake event and may take on quicksand-like properties. Liquefaction tends to increase earthquake damage.

Urbanized area transportation projects subject to potential problems from earthquake fault zones are noted in **Tables 8-8 and 8-9**. Projects in areas with high liquefaction potential are listed in **Tables 8-10 and 8-11.**

TABLE 8 - 8 SALT LAKE–WEST VALLEY URBANIZED AREA PROJECTS WITH POTENTIAL TO CONFLICT WITH FAULTS

STREET	FROM	TO
500 South / 700 South	Surplus Canal	5600 West
I-80	1300 East	Parleys Canyon
SR-201	3200 West	Mountain View Corridor
4500 South	I-215	2700 East
Highland Drive	Draper City Limits	Traverse Ridge Road
Wasatch Blvd.	7000 South	Little Cottonwood Road

TABLE 8 - 9 OGDEN–LAYTON URBANIZED AREA PROJECTS WITH POTENTIAL TO CONFLICT WITH FAULTS

STREET	FROM	TO
US-89	I-15 (Farmington)	I-84
Skyline Drive (North)	2600 North	US-89
1100 West (Pleasant View)	Skyline Drive	4000 North

TABLE 8 - 10 SALT LAKE–WEST VALLEY URBANIZED AREA PROJECTS IN AREAS OF HIGH LIQUEFACTION POTENTIAL

STREET	FROM	TO
500 South / 700 South	Surplus Canal	5600 West
California Avenue	I-215	7200 West
SR-201	3200 West	Mountain View Corridor
3500 South	2700 West	4000 West
4500 South / 4700 South	I-15	Redwood Road
5400 South	I-15	Mountain View Corridor
7000 South	State Street	Redwood Road
9000 South	I-15	Bangerter Highway
10600 South / 10400 South	I-15	Redwood Road
Bangerter Highway Interchange	@ Redwood Road	
14600 South	D&RGW Railroad Structure	
8400 West	SR-201	3500 South
7200 West	I-80	3500 South
Mountain View Corridor	SR-201	6200 South
5600 West 4800 West	I-80 California Avenue	SR-201 3500 South
Redwood Road	Davis Co. Line	1000 North
Bingham Junction	7000 South	8400 South
I-15 Interchange	@ 100 South	

Mitigation - Liquefaction can disrupt transportation networks, and destroy or severely damage residential, commercial, and other structures. When transportation infrastructure is planned in high liquefaction areas, it will be important to consider design and construction guidelines that, if adhered to, will mitigate or minimize the effects of liquefaction. It is equally important to consider design guidelines to minimize the destructive effects of liquefaction for residential and other structures. A variety of measures can be incorporated into the design of a structure so that it can better withstand the effects of liquefaction. Information regarding preventive actions that can mitigate the potential efforts of liquefaction can be obtained from the relevant county Hazard Mitigation Plan and from hazard mitigation planners. With regard to faults, it is important to be aware of the areas where movement along a fault could damage transportation infrastructure. Measures can be taken that can minimize the effects of fault movement. The most important preventive measure is to avoid building on a fault, which is particularly applicable to urban development. Among other measures, transportation structures can be reinforced and designed to better withstand earthquakes.

TABLE 8 - 11 OGDEN–LAYTON URBANIZED AREA PROJECTS IN AREAS OF HIGH LIQUEFACTION POTENTIAL

STREET	FROM	TO
1800 North	200 West	5000 West
200 South (Syracuse)	2000 West	North Legacy Corridor
Syracuse Road	1000 West	North Legacy Corridor
Hill Field Road	2200 West (Layton)	3200 West (Layton)
700 South / 800 South	I-15	2700 West
Parrish Lane (Centerville)	I-15	1250 West
I-215 Interchanges	@ Legacy Parkway	@ I-15
North Legacy Corridor (Davis Co.)	Weber Co. Line	I-15 / US-89
2000 West	Weber County Line	North Legacy Corridor
2700 West (Layton)	Hill Field Road Extension	North Legacy Corridor
Redwood Road	500 South (Davis Co.)	2600 South
I-15	US-89	I-215
I-15 Interchanges	@ Lund Lane	@ Parrish Lane
2600 North / 2700 North	I-15	3500 West
1200 South	I-15	North Legacy Corridor
24th Street	I-15	Wall Avenue
Hinckley Drive	1800 West	Midland Drive
40th Street	Adams Avenue	Gramercy Avenue
4000 South	1800 West	North Legacy Corridor
Midland Drive	Hinckley Drive	3500 West
5600 South	1800 West	3500 West
5500 South / 5600 South	3500 West	5800 West
North Legacy Corridor (Weber Co.)	Davis County Line	1200 South
4700 West	4000 South	5100 South
3500 West	1200 South	Davis County Line
1800 West	1200 South	2700 North
I-15	Box Elder County Line	2700 North
I-15 Interchange	@ 24th Street	
1200 West	Pioneer Road	12th Street
1100 West (Pleasant View)	Skyline Drive	4000 North

GREEN INFRASTRUCTURE

Green Infrastructure is an interconnected network of natural systems that provide a diverse range of environmental, social, recreational, psychological, public health, and economic benefits. The natural systems that make up green infrastructure include features such as forest preserves, historic sites, agricultural lands, rivers, wetlands, parks, and nature reserves. **Figure 8-15** illustrates the landscape features of green infrastructure.

The term "green infrastructure" originated in the strategic conservation planning field led by The Conservation Fund and the U.S. Forest Service. Their emphasis was primarily on forests, wetlands, and large natural areas. These agencies propose that natural systems are identified as infrastructure because they support essential ecosystem functions upon which all life depends. Large protected and connected areas are the foundation for a sustainable green infrastructure network.

Connectivity is important in planning for and upgrading

FIGURE 15 GREEN INFRASTRUCTURE FEATURES

man-made infrastructure (gray infrastructure) such as roads, storm drains, sewers, utilities and levees. This large scale connected approach is just as important in understanding and improving green infrastructure. An interconnected system allows for greater vitality, value and function of ecological, hydrological, recreational, and agricultural networks, promoting the economy and contributing to the health and quality of life of residents.

(Re)Connect: The Wasatch Front Green Infrastructure Plan

The Wasatch Front Region is characterized by considerable ecological and biological diversity, cultural richness, historical depth, and an abundance of recreational resources. All of these attributes and features are dependent upon the Region's geography and natural resources.

Population growth has led to widespread land use changes. Unfortunately, urbanization is reducing natural landscapes and affecting ecological systems. This, in turn can affect the Wasatch Front Region's economic health and quality of life for residents. Taking a green infrastructure approach in the Wasatch Front can help offset the negative aspects of urbanizations. However, taking this approach requires identifying and understanding natural systems and protecting those systems, before development or degradation begins, as well as seeking to restore valued lands and connectivity in already developed landscapes.

(Re)Connect is the product of a collaborative effort in order to identify and connect the Region's green infrastructure. The Plan identifies valuable natural and developed areas, as well as potential connections between these areas. The Plan also helps determine which lands can accommodate growth and which lands are better suited for protection, preservation or conservation. It places a strong emphasis on implementation and identifies strategies that can be used by the Wasatch Front Regional Council, its members, counties, municipalities, transportation entities, other government entities, private foundations and the general public to ensure inclusion of green infrastructure planning in long range initiatives. The Plan establishes environmental priorities to guide planners in reviewing development applications, allocating funding, updating municipal general plans, and making acquisition decisions. (Re)Connect is a valuable tool for guiding future conservation efforts and planning decisions. **Figure 8-16** illustrates the GIS layers used to develop the green infrastructure network designs.

The Benefits of Green Infrastructure

Green Infrastructure benefits a large number of people in the Wasatch Front in numerous ways. It enhances public health and safety through increased access or availability of parks, trails, walking paths, trees, recreation areas, and even wildfire suppression. It can provide a natural method for capturing and cleansing drinking water and storm water. It can promote healthy food production through increased community supported agriculture, pocket gardens, and the protection or preservation of agricultural lands and prime farmland soil. Green infrastructure can also mitigate flood hazards through the implementation of natural storm water detention basins.

Some green infrastructure benefits, such as water purification, nutrient storage and cycling, flood attenuation, soil generation, and carbon sequestration are necessary functions that otherwise would be ignored or provided by construction expensive gray infrastructure

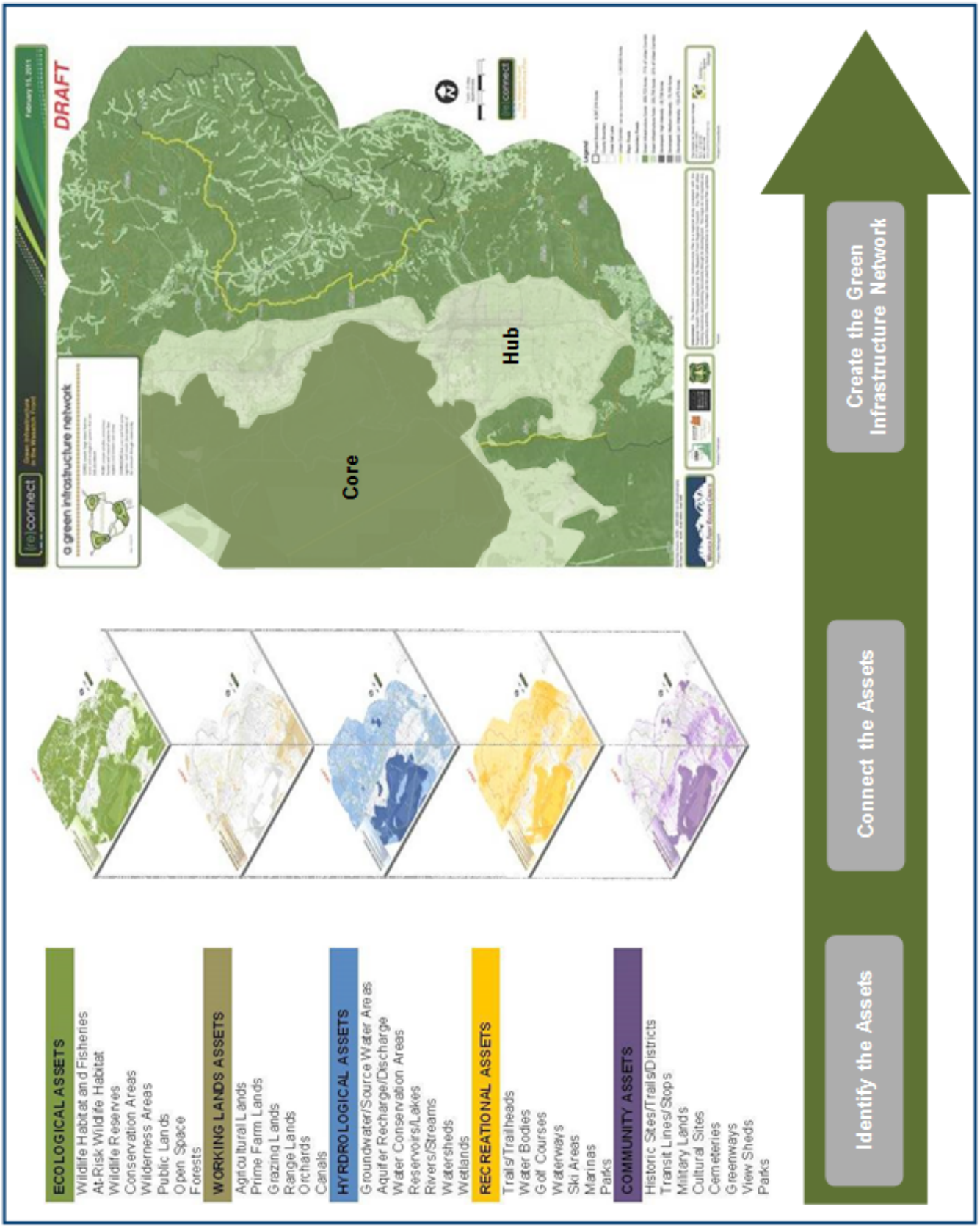
systems. The ecosystem benefits provided by green infrastructure have considerable financial value when compared with the costs of generating equivalent benefits from gray infrastructure.

Green Infrastructure and Transportation Planning

If green infrastructure and gray infrastructure are considered as two different systems within the same overarching network, then green infrastructure planning and transportation planning are simply two strategies for assessing and improving the same interconnected regional network. The tenets of green infrastructure can help transportation planners more fully understand the benefits of an integrated planning approach and vice versa. In other words, green and gray infrastructure function together; they are inherently connected, and planners should be able to draw from both fields to understand the complexities of the urban landscape and the potential benefits afforded by increased connectivity.

The growth principles and objectives outlined in the 2015 – 2040 RTP are fundamental to green infrastructure planning as well. Both plans seek to protect and enhance the environment, strengthen the sense of community, enhance the regional economy, promote regional collaboration, and ensure public health and safety. Working with transportation planners and others, the green infrastructure plan can help shape urban and suburban form and promote the best possible patterns of development.

MAP 8-16


DRAFT
[re]connect
a green infrastructure network
Core
Hub
ECOLOGICAL ASSETS
Wildlife Habitat and Fisheries
At-Risk Wildlife Habitat
Wildlife Reserves
Conservation Areas
Wilderness Areas
Public Lands
Open Space
Forests
WORKING LANDS ASSETS
Agricultural Lands
Prime Farm Lands
Grazing Lands
Range Lands
Orchards
Canals
HYRDROLOGICAL ASSETS
Groundwater/Source Water Areas
Aquifer Recharge/Discharge
Water Conservation Areas
Reservoirs/Lakes
Rivers/Streams
Watersheds
Wetlands
RECREATIONAL ASSETS
Trails/Trailheads
Water Bodies
Golf Courses
Waterways
Ski Areas
Marinas
Parks
COMMUNITY ASSETS
Historic Sites/Trails/Districts
Transit Lines/Stops
Military Lands
Cultural Sites
Cemeteries
Greenways
View Sheds
Parks
Identify the Assets
Connect the Assets
Create the Green Infrastructure Network

PUBLIC HEALTH AND TRANSPORTATION

An obesity problem among the region's residents is of concern to officials responsible for public health. Obesity is the result of the lack of physical activity, among other contributing factors. Reliance on personal vehicle use, along with work in employment sectors that require little or no physical activity, are part of the modern sedentary lifestyle. Although Utah residents are healthier than many people, the state still faces repercussions caused by public health conditions. Nationally, for example, physical inactivity accounts for about 2.4 percent of health care costs, or approximately $24 billion per year.

In 2006, the WFRC commissioned a study on active living / transportation for the Wasatch Front Region. The study recommended incorporating physically active mode opportunities into the existing regional transportation system. The study report covered subjects ranging from funding options to policy guidelines and design elements. With the adoption of these active transportation policies by the Regional Council, and by making them a critical component of the regional transportation system, the WFRC is encouraging local governments and other organizations to accommodate more pedestrian and bicycle options in their transportation planning products.

The WFRC adopted the policy approaches / recommendations in 2006 because of the benefits that could be realized as these policies are implemented. The policy recommendations essentially call for the following:

- provide adequate, safe, and appropriately located infrastructure for all modes of transportation;
- provide active links (sidewalks and bike paths) to existing and new transit stations and stops, and;
- provide bicycle parking and storage in transit oriented locations.

Plan and implement land use and transportation choices that provide for and encourage active transportation modes.

A variety of benefits can result from following active living / transportation policies. Recent studies have shown that if active mode infrastructure is provided and is convenient, people who would not typically seek out these types of facilities will use them. Linking mass transit facilities with active mode transportation facilities encourages people to use both modes of transportation. Providing mixed and transit oriented land uses, makes communities more walkable and supportive of non-motorized or active modes of transportation. If active living / transportation infrastructure is implemented in new developments, and more opportunities for active living are provided in the urban environment, it is more likely people will make choices about modes of transportation that do not include the automobile. The resultant benefit would not only improve the physical health of those who walk, ride bicycles, use transit, etc., but it will also reduce the amount of VMT and traffic congestion, improve air quality, and improve the overall quality of life.

NEPA PRINCIPLES AND REQUIREMENTS

During the preparation of the 2015 – 2040 RTP, certain aspects and principles derived from the National Environmental Policy Act were considered and incorporated into the planning process. In total these actions meet and exceed the federal planning and environmental requirements found in 23 CFR Part 450.316 & 318. A number of the environmental factors, or categories to be considered, and types of analyses required by NEPA were utilized, such as the manner of describing project purpose and need, safety and security, economic development, land use, alternatives analysis, and core system performance measures. Systems proposed for and projects selected for inclusion in the 2015-2040 RTP were evaluated for their potential impact on the environment. Major indices considered included air quality, noise, impact on wetlands, water bodies and flood plains, and existing and planned land use.

The 2015 – 2040 RTP has benefited from the updating of the Wasatch Front visioning process and the development of the uPEL tool. The uPEL tool is a web based environmental tool used for assessing the direct environmental impacts of transportation actions.

PURPOSE AND NEED CONSIDERATIONS

Brief "purpose and need statements" for each of the highest cost, first phase projects in the 2015 – 2040 RTP are included in the following section. The premise behind the development of these purpose and need statements is that they will help inform the corridor level analysis for each project when it is conducted. Any project that has: (1) not undergone a planning or environmental study; (2) is estimated to have a capital construction cost $100 million or more; or (3) is either built partially or wholly in the first phase of the planning horizon, is provided a brief

purpose and need statement. The purpose and needs for projects that have undergone planning or environmental studies can be found in these studies. The purpose and need statements are organized as follows: Problems, Needs, and Deficiencies; Solutions; and Expected Outcomes.

West Weber Corridor

Problems, Needs, and Deficiencies: As the western portions of both Davis and Weber County grow, there will be an increased demand for travel and transportation capacity. Many north-south (I-15) and east-west facilities are already severely congested and motorists are experiencing significant delays. More regional capacity is needed in closer proximity to accommodate new demand. In addition, there are few existing alternative north-south routes that could be used by commuters and emergency response vehicles in the event of an incident on I-15.

Solutions: Construction of a north-south limited access principal arterial, or parkway type facility from Farmington to the Box Elder / Weber County line would provide part of the solution to traffic growth in the area. In addition, the corridor is planned to be wide enough to allow for future options, such as mass transit and non-motorized facilities to be incorporated, as needed, into the corridor.

Expected Outcomes: The expected outcomes of this project would be as follows: additional north-south transportation capacity to help meet 2040 travel demand; a single, continuous alternate north-south route that could reduce congestion and increase safety when I-15 is congested, under reconstruction or closed because of accidents; and an additional route for emergency vehicle response.

Transit Project Number 27 - Salt Lake City - Foothill Drive - Wasatch Drive

Problems, Needs, and Deficiencies: UTA Route 2, ("2 the U"), is a high performing route. It could perform even better it was extended to Research Park and received operating and capital upgrades. Increasing congestion in the corridor, and high potential for standing loads on this line, may become a deterrent to further ridership growth. Much of the area between Salt Lake Central and the University has a large population of disadvantaged people. The area between Salt Lake Central and 700 East constitutes a Regional Activity Center. The eastern portion of the University campus, the medical center, and Research Park constitute large infill opportunities.

Foothill Boulevard is a congested corridor through which run several transit lines. Foothill Boulevard is the most heavily used access corridor to the University of Utah area from the east side of the Salt Lake Valley. The University of Utah area is the second largest transportation destination in the Salt Lake Valley and is growing quickly. The area near Parley's Way is forecasted to become an activity center. Preserving transit speeds and schedule reliability on Foothill Boulevard is essential.

Wasatch Boulevard in the East Millcreek, Cottonwood Corporate Center, Cottonwood Heights areas provides access to large residential communities and several popular canyons. Efforts are continuing to preserve these canyon areas that also serve the Region as vital watersheds. It is anticipated that the gravel pits in this area will become a significant activity center. Transit has been suggested as a premier tool in these preservation and development efforts.

Solutions: The following project objectives have been identified that would either minimize or eliminate problems: (1) expand the hours of service on UTA's "2 the U" bus line and extend that service through Research Park and along Foothill Boulevard with service to the East Millcreek park-and-ride; (2) add a transitway connection between Mario Capecchi Drive at Research Road and Arapeen Drive at Wakara Way to provide a more direct transit connection between the University of Utah Medical Center and Research Park; (3) improve reliability, comfort and speed improvements on 200 South and Wasatch Drive by implementing Enhanced Bus treatments such as TRAX-like station amenities, transit signal priority and queue jumpers; and (4) improve reliability, comfort, and speed improvements on North Campus Drive, Mario Capecchi Drive, and Foothill Drive with Bus Rapid Transit treatments, such as transit lanes in addition to TRAX-like station amenities, transit signal priority, and queue jumpers.

Expected Outcomes: The expected outcomes of this project would be the following: a high visibility transit mall east/west through Downtown Salt Lake City; large ridership gains in the corridor; reduced vehicle miles traveled and congestion associated with Research Park, and the Medical Center; the preservation of transit travel speeds and schedule reliability throughout the corridor; improved reliability on existing services from Cottonwood Heights, Park City, and Ball Park Station/ Sugarhouse.

Interstate 80

Problems, Needs, and Deficiencies: This section of I-80 was constructed nearly 40 years ago and has essentially exceeded its anticipated lifespan. There are areas in the corridor where the facility is deteriorating. The pavement needs to be completely replaced. The safety problems are, to a large degree, rooted in its design. Current travel speeds and traffic volumes are higher than what the facility was designed for in the 1960s. The facility is plagued with numerous drainage problems. Culverts tend to be partially filled with dirt, storm drains are deteriorating, etc.

Solutions: The following project objectives have been identified that would either minimize or eliminate problems: (1) preserve the infrastructure in the corridor by providing adequate drainage and structurally adequate pavement and bridges; (2) provide a multi-modal system that accommodates future travel demand and improves operations; (3) implement measures designed to improve highway safety where economically justified; (4) optimized capacity through the utilization of TSM and TDM; (5) provide for multi-modal transportation opportunities where feasible; and (6) improve transit operations in the corridor.

Expected Outcome: The expected outcomes of the improvements in the corridor would include the following: structurally adequate pavement, bridges, and other infrastructure; increased capacity and improved operations; enhanced safety, retaining of I-80 as a significant link in the trans-continental transportation system; increased use by multi-modal and transit patrons; and preservation and enhancement of the economic viability of the area that I-80 serves.

State Route-201

Problems, Needs, and Deficiencies: This corridor contains several sections, and facilities between I-215 and the Tooele / Salt Lake County boundary that are proposed for various improvements. The primary needs in this corridor are greater capacity, improved operational efficiencies, and increased safety, particularly at existing intersections / Interchanges. Much of the growth that will add to the need for greater capacity comes from the industrial employment centers that are anticipated for the areas served by this corridor. In particular, there is a trend for transportation-oriented or trucking companies to locate near the corridor with the potential of greatly increasing truck traffic and movement of goods. There is a need to replace at-grade intersections with interchanges to: meet safety concerns; permit travel at design speeds; and increase capacity.

Solutions: The addition of two auxiliary lanes (one in each direction), in conjunction with the upgrade of the Interchange, new interchanges at 7200 West and 8400 West, the upgrade of the interchange at I-80, and other proposed projects will provide the improvements needed to enhance the function of this important highway.

Expected Outcome: The expected outcome of planned improvements is to provide greater east / west capacity for anticipated traffic in the corridor. In particular, the movement of goods should be greatly facilitated, and add to the economic competitiveness of the Wasatch Front Region. This facility is intended to compliment and augment I-80, which is located about two and one-half miles to the north and provides one of the most significant east / west transcontinental interstate routes in the Nation.

10400 / 10600 South

Problems, Needs, and Deficiencies: Congestion on east-west roadway facilities is becoming a more difficult problem each year. It is hampering mobility in the area as heavy growth continues in the southwestern part of Salt Lake County. Travel demand is growing at a rapid rate and capacities need to be increased, particularly on 10400 / 10600 South. The two lanes are unable to meet current demands of an arterial; lack paved shoulders; have only partial curb, gutter, and sidewalk; and have insufficient sight distances in some areas. Consideration needs to be given to geometric design, signal operations / coordination, transit, and non-motorized facilities deficiencies. Lastly, new residential and commercial growth does not have adequate access to a minor arterial street, which limits access to the regional transportation system.

Solutions: Add capacity and extend the corridor further to the west to connect with SR-111, in order to complete the regional transportation system. Some specific solutions would include the following: (1) widening of the corridor to a consistent cross-section with additional travel lanes, shoulders curb and gutter, park strips, and sidewalks; (2) adding bicycle lanes to the corridor, in accordance with regional and local master plans; (3) widening and improving intersections along the corridor to provide dedicated right and / or left turning lanes, and upgraded traffic signals; (4) implementing additional raised center-island medians at locations along the corridor for access control and access management

purposes; and (5) accommodating transit service along the corridor by providing 10-foot shoulders that can be used for bus loading and unloading.
Expected Outcome: The proposed action is intended to ensure that existing and future traffic is adequately accommodated. Other objectives of the proposed action include: enhanced operational characteristics; improved operation of the major signalized intersections; and enhanced opportunities to incorporate multi-modal facilities within the corridor.

4500 / 4700 South

Problems, Needs, and Deficiencies: This facility essentially traverses most of the Salt Lake Valley in the east / west direction starting at I-215 (east) and ending at 6400 West. It is classified as a principal arterial and as such plays a significant role as a roadway facilitating traffic in the east / west direction. Residential and commercial development in the corridor area has added to the considerable traffic congestion evident on this facility. Many adjacent commercial developments have compromised the proper functioning of the roadway and better access management is needed. Often during the peak hour there is a complete breakdown of the traffic flow from I-15, particularly westbound at the major intersections, such as Redwood Road, I-215 (west), and Bangerter Highway. There is a need to add two lanes throughout the entire corridor, along with other improvements, in order to increase roadway capacity. Also, there is a need for more transit facilities in the corridor.

Solutions: The 2015 – 2040 RTP calls for the addition of two travel lanes (one lane in each direction). In addition, operational and safety improvements at the major intersections, bicycle/pedestrian improvements, ITS, TDM, and TSM type measures need to be implemented. Public transit in the form of a Bus Rapid Transit II (BRT II) is also being proposed to serve a portion of the corridor, between about 600 West and Redwood Road.

Expected Outcome: Overall, planned improvements are expected to provide increased capacity within the 4500 / 4700 South Corridor, improved operations at the intersections / interchanges, improved safety, and improved bicycle and pedestrian facilities. Also, improved transit service in a portion of the corridor, particularly at employment / activity nodes can be expected.

3500 South

Problems, Needs, and Deficiencies: Traffic volumes in the 3500 South corridor already exceed capacity, particularly at intersections. In the corridor there are variations in the shoulder widths and medians, and inconsistencies in the number of travel lanes. In addition, poor access control to the adjacent properties has greatly compounded the traffic congestion. Travel times are expected to double by 2040 if improvements are not made. Adding to the problems in the corridor is poor pavement condition, which hampers the roadway's operational efficiency. Mass transit is also being hampered by slow speeds and lack of transit support facilities (waiting areas, sidewalks, crosswalks, etc.). Lastly, pedestrian and bicycle use is being discouraged because of the lack of adequate facilities. Beside the transportation related problems, there are also issues relating to land use, aesthetics and urban design, and street infrastructure.

Solutions: Consideration should be given to strategies that include spot improvements, better management of signal operations at intersections, and implementing general upgrades to improve traffic flow, such as access management. Improving transit facilities and service would reduce congestion by attracting more transit riders. Improvement would include more safe, accessible, and easily identifiable bus stops and informational kiosks, increasing transit frequency, timeliness, and reliability, and providing express bus service with signal prioritization during peak hours. Vehicle, pedestrian, and bicycle safety improvements at intersections and mid-block should be considered.

Expected Outcome: It is expected that implementing planned capacity and other improvements would provide an efficient and safe transportation arterial; allow safe and convenient access to the local businesses adjacent to and close by the corridor; and would accommodate the needs of multi-modal travel, including transit, pedestrian and bicycle modes.

12600 South

Problems, Needs, and Deficiencies: The southwestern part of Salt Lake County is growing at a very rapid rate. As growth continues, ever increasing number of vehicles are using the east-west roadway facilities, of which 12600 South, categorized as a principal arterial, is a part. Future residential and commercial development will dramatically increase travel demand and exceed the existing capacity of 12600 South and its intersections with other roads. This action will allow urban development along this corridor to be served, and a portion of the regional

transportation system to be completed. The 12600 South corridor has several problems that affect its ability to accommodate current and future travel demand. These deficiencies include: narrow, unimproved two-lane roadway sections; some sections not meeting design standards, inefficient signalization at intersections; and poor access to other principal arterials.

Solutions: Add capacity in the form of additional travel lanes, turning lanes and medians. Improve the operational characteristics of intersections, including channelization, signal cycle, and other improvements that will increase the roadway's functionality. Enhance safety by adding medians, shoulders, curb and gutter, park strips, and sidewalks. Increase capacity to accommodate inter-modal facilities within the corridor, including buses, bicycles, pedestrians, trails, and other non-motorized modes.

Expected Outcome: The expected outcomes would include improved east-west regional travel, enhanced functionality and safety, improved operations at the various intersections, corrected design deficiencies, more choice with regard to modes of transportation, and improved access to a principal arterial and the regional transportation system.

Mountain View Corridor

Problems, Needs, and Deficiencies: Needs in the Mountain View Corridor area result from a rapidly growing population and employment opportunities. The existing roadway network in the area consists of minor arterial streets and is not well suited to accommodate high volume and longer-distance traffic. Existing transit consists of local bus and some express bus service. Existing deficient transportation conditions, which will worsen in the future, have resulted in the following problems: lack of adequate north-south transportation capacity in western Salt Lake County; lack of adequate transportation capacity in northwest Utah County; increased travel time and lost productivity; lack of transit availability; reduced safety due to increased roadway congestion; and lack of continuous pedestrian / bicycle facilities.

Solutions: The problems noted above can be addressed with the following improvements. First, build a freeway between I-80 and SR-201 with a total of four lanes (two lanes in each direction. Second, build a freeway from SR-201 to the Salt Lake / Utah County line with a total of six lanes (three lanes in each direction). Third, implement congestion management programs, such as HOV lanes (one in each direction), ramp metering, and Intelligent Transportation System (ITS) measures that would manage traffic flow. Fourth, build interchanges so that various arterial streets can be interconnected with new facilities in the Mountain View Corridor. In addition, provide transit facilities in the form of express bus in the Mountain View Corridor, and in the 5600 West Corridor, from 12600 South to I-80, provide transit facilities, such as bus rapid transit, or other transit service as demand warrants. Additional facilities for non-motorized modes are planned for the Mountain View Corridor to accommodate both pedestrian and bicycle travel.

Expected Outcome: The expected outcomes from this major improvement are increased mobility resulting from reduced congestion, increased availability of transit and other travel modes, increased economic opportunities, improved access to adequate transportation facilities for residential areas and improved regional mobility.

Interstate 15

Problems, Needs, and Deficiencies: The problems and needs associated with this project affect both Salt Lake and Utah Counties. Currently, there is significant traffic congestion in the I-15 corridor in southern Salt Lake County (from 10600 South to the County line) as well as in Utah County from the Salt Lake / Utah County line to Santaquin. There are segments within the described termini of this major freeway improvement project that do not meet current safety standards. Because of rapid population and employment growth, the corridor is fast approaching capacity. Conditions will worsen by the year 2040, resulting in unacceptable levels of service conditions. Projected growth is expected to double the traffic volumes on I-15 by 2040, resulting in increased travel time and crash rates, which will adversely affect the quality of life in the Region.

Solutions: The following improvements are being proposed in the corridor in an effort to solve the pressing problems of capacity, safety and other needs: Expand the freeway from six to ten lanes (five lanes in each direction) in Salt Lake County and expand lanes as needed (to a maximum of nine lanes) in Utah County. There are also traffic management options, including TSM, TDM, and ITS programs, that are proposed for improving the project's operating efficiency, reducing the vehicular demand during peak travel times, and improving safety and efficiency through the application of advanced technology. Public transit alternatives such as commuter rail, light rail, and bus service will play an important role in reducing traffic on I-15.

Expected Outcome: The project is expected to improve national, regional, and intra-county mobility for people and goods, provide multi-modal transportation choices as part of the overall transportation network, provide cost effective transportation solutions, and to minimize and mitigate impacts to the natural and cultural environments. It will also improve an essential part of a transportation system that is already compatible with locally adopted growth and development policies and land use plans; and will eliminate design deficiencies that hamper operations and create safety concerns.

Highland Drive

Problems, Needs, and Deficiencies: Due to the rapid population and employment growth in southeast Salt Lake County (Cottonwood Heights, Sandy, and Draper), transportation demands have increased significantly. Existing roadways are becoming ever more congested, necessitating increasing roadway capacities in the area. Specifically, there are needs for: improved mobility for both longer and shorter distance travel; improved access within the transportation corridor area; and stronger policies to keep the transportation corridor open, or free from additional development so that it will be feasible to provide more capacity. In addition, there is a need to extend the Highland Drive Corridor southward in an effort to complete an interconnected regional transportation network. Highland Drive has been functionally classified as a principal arterial and, therefore, is intended to play a significant role in providing north-south mobility.

Solutions: Add capacity by widening existing sections of Highland Drive from 2 to 4 lanes, build new sections of 4-lane roadway, and improve existing intersection operations. Where appropriate, provide pedestrian, bicycle, and mass transit (express and local bus) facilities throughout the Corridor, as appropriate.

Expected Outcome: Completion of planned improvements in the Highland Drive Corridor is expected to ameliorate severe traffic congestion (peak hour) on certain sections of 1300 East and 700 East; minimize or eliminate the use of local streets for through traffic (for the lack of an alternative route); and generally improve access / mobility in the southeastern part of Salt Lake County.

Redwood Road

Problems, Needs, and Deficiencies: The projected 2040 peak hour traffic demand exceeds available transportation capacity. Redwood Road must be improved in order to provide a more safe transportation facility for existing commercial and residential development and to more adequately move traffic. Currently, bicycle and pedestrian facilities are deficient and do not adequately accommodate users. There is some conflict with wildlife in the corridor.

Solutions: Increase the number of lanes from 2 (sometimes 3 lanes) to 5-lanes with two through lanes in each direction. This will increase the capacity of Redwood Road to accommodate existing and anticipated 2040 traffic, reduce congestion along the project corridor; and enhance transportation safety for all users. Make operational improvements throughout the length of the facility. Redwood Road will be improved in accordance with current design standards. Bicycle lanes and shoulders will be added where necessary, intersections will be upgraded, medians will be added in some locations, and wildlife corridor connectivity will be addressed. Plans call for wildlife crossings to be constructed at three locations along Redwood Road.

Expected Outcome: Planned improvements should accomplish the following: improve connectivity between existing and proposed transportation arterials and highways; provide a transportation infrastructure that meets current roadway standards and that will be an asset to the communities the facility serves; provide a transportation facility that operates an acceptable level of service; maximize long-term roadway capacity by managing access concurrent with UDOT policies and existing and planned land uses; improve emergency response time and availability of emergency response teams; and reduce conflicts with wildlife living near or crossing Redwood Road.

State Route-111

Problems, Needs, and Deficiencies: Residential and commercial growth will mean substantially more traffic volumes on SR-111 and other roads in the area. Currently, SR-111 is a two-lane facility. As the western portion of Salt Lake County continues to grow, capacity, safety, and other deficiencies will need to be further addressed. Since SR-111 is planned to function as a principal arterial and is expected to carry relatively high speed and high volume traffic, there is a need to increase the number of lanes from two to four lanes. Principal arterial roadways are spaced about every two or three miles. The SR-111 corridor is needed on the west side of the Salt Lake Valley to help complete the principal arterial roadway network.

Solutions: The proposed solutions to the needs

outlined above are as follows: Provide two additional travel lanes (one in each direction); Improve the operations and safety of the existing and future SR-111 intersections by providing turning lanes and other improvements; implement ITS, TDM, and TSM strategies; and accommodate non-motorized travel, such as pedestrian and bicycle facilities.

Expected Outcome: With the planned improvements included in the project, the following outcomes are expected: Improved capacity to accommodate increased traffic demand traveling at relatively high speed; the construction of efficient and safe intersections; implementation of ITS, TDM and TSM strategies; accommodation of non-motorized modes of transportation; and TDM, and TSM strategies; and reduced conflicts with wildlife living in proximity to the corridor.

PLANNING FACTORS

The Safe, Accountable, Flexible, Efficient Transportation Equity Act–A Legacy for Users (SAFETEA-LU) required regional and metropolitan planning organizations to assure that the transportation planning process provides for the consideration of projects and strategies in accordance with eight general planning factors. MAP-21 was adopted in 2012 to replace SAFETEA-LU. Under MAP-21 these planning factors remain unchanged. These factors are designed to assist planners in developing comprehensive solutions to area transportation needs. The MAP-21 planning factors for improving transportation system management, operation, efficiency and safety are consistent with the goals and objectives of the 2015 – 2040 RTP. The following paragraphs list the eight MAP-21 planning factors and describe how the 2015 – 2040 RTP has considered each requirement. Appendix Q, entitled "Provisions For Planning Factors," provides a brief summary of the federal guidance on interim SAFETEA-LU provisions.

1. **Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency.** The 2015 – 2040 RTP provides a network of improved transportation facilities, both highway and transit, which are essential to the economic vitality of the Region. The 2015 – 2040 RTP calls for the modernization of a critical portion of the local interstate freeway system, an improved regional highway network, Bus Rapid Transit, enhanced bus service, the extension of the light rail system, regional commuter rail, and increased attention to intermodal center locations and development. The plan improves the ability of the workforce to reach a higher proportion of jobs within typical commute times. Similarly, the plan improves the ability of businesses to access a higher proportion of the workforce and potential patrons. This improved accessibility benefits both individuals who rely on private automobiles and for persons using public transportation. Improved local and regional accessibility and connection to large employment centers, business districts, commercial developments, industrial parks, educational institutions, shopping malls, neighborhoods, and area airports will promote the Wasatch Front Region's competitiveness, productivity, and efficiency.
2. **Increase the safety of the transportation system for motorized and non-motorized users.** The 2015 – 2040 RTP incorporates the recommendations of the Utah Comprehensive Safety Plan developed by UDOT with a goal of reducing crashes and eliminating fatalities on streets and highways. The WFRC participates as a member of UDOT's Safety Leadership Team and is a sponsor of UDOT's "Zero Fatalities" campaign. The highway and transit facilities proposed in the 2015 – 2040 RTP will increase the safety of motorized and non-motorized users through new construction and other improvement projects. While safety related improvements, because of their relatively small scale, are not specifically listed or mapped, safety issues will be given due consideration through the WFRC's Transportation Improvement Plan (TIP) project selection criteria. Controlling facility access, managing congestion, reducing traffic choke points, and modernizing the design of facilities improves overall network safety. The 2015 – 2040 RTP also includes a Regional Bicycle Facilities Plan. Improved bike routes from bike lanes to separated facilities will increase the ability to safely bicycle. The Regional Bicycle Facilities Plan also suggests policies for enhancing pedestrian access and safety through appropriate urban design, site planning, subdivision design, etc. These policies can serve as guidelines for local governments to consider in land use decisions. One of the goals of the regional Bicycle Facilities Plan is to identify improvements that enhance the safety of bicycle travel. The policies for pedestrian facilities and access will also help promote safety.
3. **Increase security of the transportation system for motorized and non-motorized users.** The WFRC continues to coordinate its planning processes with the Utah State Division of Public Safety and Homeland Security and with the Utah Local Governments Association for Emergency Services

and Security in an effort to identify security issues regarding the transportation system. Both UDOT and UTA have established plans that address emergency and security issues. The highway and transit recommendations in the 2015 – 2040 RTP will increase security for motorized and non-motorized users through new construction and improvement projects that provide alternative routes and modes, especially through area choke points. For UTA, security is an important consideration in designing and operating rail and bus services. UTA employs security personnel to ensure the personal safety of its patrons. Park-and-ride lots are well lit and frequently patrolled. Finally, telephone service is provided in the event of an emergency.

4. **Increase the accessibility and mobility of people and freight.** One of the goals of the 2015 – 2040 RTP is to "Increase transportation mobility and accessibility for both persons and freight, thus promoting economic vitality in the region." The roadway and transit improvements recommended in the 2015 – 2040 RTP will help improve mobility and enhance destination accessibility. Increased mobility is provided by a variety of travel options including new or widened highways and primary arterial streets, light rail transit, BRT, enhanced bus service, new regional commuter rail transit service, bus transit hubs, planned intermodal centers, and additional transit amenities, such as park-and-ride lots. The 2015 – 2040 RTP anticipates an increase in the number of miles of bus service, including expansion of weekend and night routes, and additional paratransit service to major travel demand generators. Freight movement, both interstate and intrastate, will benefit from the reconstruction and modernization of the local interstate system, shifting a portion of trips to transit modes, improvements to the regional highway network, and other access enhancements. The region's highway system will continue to provide convenient access to air cargo facilities. Also, as part of UTA's recommended regional commuter rail project, several of the Union Pacific Railroad's intermodal facilities have been consolidated into an intermodal freight transfer center in Salt Lake City. This new hub will improve the movement of rail freight traffic.
5. **Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.** The Wasatch Choice for 2040 process, which developed a Vision for future growth and Growth Principles to guide development in the Wasatch Front Region, included a significant amount of input on what kind of future development the public would like to see. One of the purposes of this effort was to identify quality of life issues and establish approaches to enhance quality of life. The WFRC developed the 2015 – 2040 RTP's recommendations for highway and transit improvements consistent with the WC2040 growth principles and growth concepts to support a high quality of life throughout the Region. State and local plans for growth and economic development are part of the foundation of the 2015 – 2040 RTP transportation recommendations. The WFRC staff met with officials of every municipal and county to ensure that socio-economic projections developed by the WFRC are consistent with local plans and WC2040. In addition, the Utah State Economic Development Office reviewed the 2015 – 2040 RTP recommendations and provided input on priorities as they affect further economic growth in the Wasatch Front Region. Concern for the environment of the Wasatch Front Urbanized Area is an integral part of the 2015 – 2040 RTP planning process. Recommended facilities are considered with respect to environmental impacts at the system level, utilizing maps and other information identifying environmental concerns. As facilities are brought forward through the planning, design, and construction process, appropriate environmental reviews have been conducted. By attempting to maximize destination accessibility and minimize travel time, energy conservation is promoted through successful congestion management strategies, increased system capacity, the provision of transit alternatives, and the provision of active transportation facilities. The 2015 – 2040 RTP provides a number of recommendations for improved regional transit, including an increased emphasis on promoting UTA's Rideshare Program. These efforts combine to enhance mobility and accessibility to home and work, while minimizing impacts on the natural environment and reducing energy use.
6. **Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.** The 2015 – 2040 RTP recommends the development of intermodal centers and park-and-ride lots at optimum locations to improve connectivity of the regional transportation system. The 2015 – 2040 RTP also promotes shared opportunities for multimodal transportation development including light rail transit, commuter rail, augmented bus service, and pedestrian and bicycle pathways. Further, transportation routes and connections are coordinated with development

centers to maximize transportation connectivity and cross-mode utilization. In a related way, identified park-and-ride lots are located near automobile, pedestrian and bicycle connections for access to bus service and carpools. Feeder bus service to the light rail system is provided for in the 2015 – 2040 RTP, along with transit hubs where transfers can take place between different travel modes. Transit-to-transit connections are possible, as well as transit to aviation connections. Access to airport cargo facilities, railroad freight service, Amtrak passenger rail service and intrastate / interstate bus lines (i.e. Greyhound) is accommodated for at planned intermodal facilities. One of the 2015 – 2040 RTP'S goals is to "Provide an equitable distribution of transportation modes, facilities and benefits to permit all geographic, economic and social groups to effectively participate in essential urban activities."

7. **Promote efficient system management and operations**. The WFRC has both congestion management and pavement management processes. It also encourages implementation of transportation demand management and transportation system management strategies developed to promote efficient system management and operations. These strategies rely on specific recommendations to be implemented as existing highway facilities are improved or new facilities constructed. Each capacity widening project recommended in the 2015 – 2040 RTP is accompanied by a list of specific methods to improve system efficiency. These lists include such advanced traffic management system strategies as access management plans, fiber optic cables for the implementation of the region's ITS, message signs, cameras and travel demand concepts designed to promote the efficient use and management of the existing and proposed transportation network. The WFRC, in cooperation with UDOT, UTA, and local communities, has prepared an ITS Architecture Plan to guide the implementation of ITS projects for both highway and transit.
8. **Emphasize the preservation of the existing transportation system.** The financial analysis section of the 2015 – 2040 RTP assures that adequate funding for maintenance, operation, and preservation of highway and transit facilities is provided. The 2015 – 2040 RTP assumes adequate funding to preserve existing streets and highways and transit facilities. This is a priority of both UDOT, UTA and local governments. UDOT has recently updated its asset management program that identifies funding levels needed to maintain and preserve UDOT's pavements and structures, and to improve the safety of its system. These new projections of funding needed to preserve the existing system, show an increase from previous estimates and were included in the financial plan. This program, combined with proper access management, incident management, and the updating of signal timing, will help preserve the existing transportation system. The 2015 – 2040 RTP also recommends the upgrading of transit facilities and the replacement of all vehicles on a regular schedule. Funding projections for transit preservation and maintenance have been developed in conjunction with UTA. The transit portion of the 2015 – 2040 RTP assumes replacement of buses every 12 years and recommends the construction of additional maintenance facilities. Over the years, UTA has gained a very positive reputation for maintaining its facilities and is not expected to change its maintenance policies.

CLIMATE CHANGE

The subject of climate change is scientifically complex; one that has recently generated significant discussion. Water, carbon dioxide and methane (and traces of other gases in lower proportions) are considered "greenhouse" gases (GHG), meaning that they reflect back some of the radiant heat energy that reaches the earth's surface that would otherwise return to space. Without the "greenhouse" effect of the earth's atmosphere, the mean temperature of the earth would be below freezing. Many scientists now suggest that mankind's activities are adding to the concentration of greenhouse gases in the atmosphere, resulting in potential changes in the earth's climate.

Even with this scientific research, there is still great uncertainty about the nature or degree of impact that increases to greenhouse gas concentrations will have on the climate. An evaluation of mobile source emissions on climate change is not a required element of the RTP conformity analysis. The EPA has not defined a National Ambient Air Quality Standard for CO2 emissions, and the Utah Division of Air Quality does not include CO2 in its inventory of statewide emissions from vehicles, industry, commercial activities, and homes. Without a complete understanding of CO2 emissions from all sources, it is not possible to make conclusions about future CO2 emissions in this document. However, it is important to outline some of the issues related to the role of the RTP in addressing CO2 emissions from vehicles operating on public roads.

In the context of the WFRC 2040 Regional Transportation Plan, the questions pertaining to climate are: (1) How

does the 2040 RTP impact global climate change?, and (2) How does global climate change impact the 2040 RTP?

How does the 2040 RTP impact climate change?

The vehicle emissions analysis of the 2040 RTP using the MOVES 2010 model, estimates that CO2 emissions from vehicle activity are expected to be 21 percent greater in 2040 than 2016. While this is a net increase in CO2 emissions, it is a significant decrease in the vehicle CO2 emission rate given that VMT is estimated to increase by 40 percent from 2016 to 2040. By comparison, the 2011 version of the 2040 RTP (see the **Table** below) was estimated to increase CO2 emissions by 28 percent and VMT by 47 Percent in 2040. The MOVES 2010 model estimates CO2 emissions based on assumed fuel consumption rates for vehicles. The MOVES 2010 model is not sensitive to speed (congestion conditions) when estimating CO2 emissions. **Table 8-12** provides a summary of CO2 emissions and vehicle miles of travel estimates.

Emissions of CO2 do not increase as much as VMT because New CAFÉ (Corporate Average Fuel Economy) standards aimed at improving vehicle mileage rates will have a significant impact on reducing future CO2 emissions. Also, new vehicle concepts such as hybrid electric or pure electric vehicles will contribute to reducing future CO2 emissions from vehicles. Producing more of the electricity needed for these new concept vehicles from sources other than coal such as nuclear power, wind energy, or geothermal sources would result in a net decrease in vehicle related CO2 emissions compared to vehicles relying on internal combustion engines. While expanding transit service and other transportation strategies will help reduce travel and greenhouse gas emissions, the improved emission standards for future vehicles will have the greatest impact on reducing mobile source emissions.

How does climate change impact the 2040 RTP?

The WFRC 2015 – 2040 RTP did not make any special provisions for the potential impacts of global climate change. What those specific changes would be along the Wasatch Front are not a subject considered at length in this planning document. However, the WFRC does recognize that public policies emerging from further analysis and understanding of climate change concerns could affect the implementation of later phases of the 2015 – 2040 RTP.

Speculation about the likely effect of climate change includes several possibilities. One possibility is a dryer, hotter climate. This scenario might be a benefit in terms of construction of transportation facilities as this would tend to extend the construction season. This could also reduce snow removal costs, winter weather delays, and weather related crashes. Longer periods of warm weather are also conducive to expanding active transportation opportunities. On the other hand, the negative economic impacts of a region chronically stricken with drought could significantly alter the population and employment forecasts currently found in the RTP.

The other extreme is a cooler, wetter climate. In contrast to the above scenario, this scenario would increase snow removal costs and shorten the construction season. Highway safety would be compromised and weather related delays would be more frequent and severe. A wetter Utah climate could also lead to springtime flooding from excessive runoff which could damage roads and bridges. Rising levels of the Great Salt Lake could threaten critical transportation facilities adjacent to the Lake such as I-15, I-80, and the Salt Lake City International Airport. Slope failures are another possibility, particularly in mountain passes critical to transportation such as Parley's Canyon (containing I-80), Ogden Canyon, Little Cottonwood Canyon, and Big Cottonwood Canyon. More frequent or more extreme freeze-thaw cycles can have a detrimental effect on pavement quality and service life. This possibility exists under either scenario – warmer or cooler.

In either climate scenario, Utah is already a four-season

TABLE 8 - 12 CO_2 AND VMT ESTIMATES FOR WEBER, DAVIS, AND SALT LAKE COUNTIES

YEAR	CO2 EMISSIONS (TONS/DAY)	CO2 PERCENT CHANGE FROM 2016	VMT	VMT PERCENT CHANGE FROM 2016
2016	27,567	--	43,892,182	--
2040 – RTP version 2011	35,417	28%	64,629,575	47%
2040 – RTP version 2015	33,376	21%	61,640,754	40%

state with considerable experience adapting to both types of climate. Again, as noted above, the extent to which the climate may shift- if at all- is the crucial question, and this can only be speculated at this time.

AIR QUALITY CONFORMITY DETERMINATION

Davis, and Salt Lake Counties, Salt Lake City, Ogden City and portions of Weber, Box Elder, and Tooele Counties are designated as non-attainment (or maintenance) areas for one or more air pollutants. Specifically, there are four areas in the Wasatch Front region, which are subject to air quality conformity regulations. These areas are listed in **Table 8-13**.

An analysis of projected vehicle related emissions from the transportation network as defined in the 2015 – 2040 RTP shows that vehicle emissions will pass the conformity tests for each non-attainment area along the Wasatch Front. A summary of the mobile source emission budgets as defined in the State Implementation Plan is given in **Table 8-14**. The analysis demonstrating conformity is contained in "Air Quality Memorandum 32", a copy of which can be found on the WFRC website here.

Vehicle Emission Modeling

Vehicle emissions were estimated using the EPA approved MOVES2014 model. Data from the WFRC travel model was used to describe the transportation network for the analysis years 2011, 2019, 2024, 2034, and 2040. The travel model provides data for VMT, hourly distribution

TABLE 8 - 13 WASATCH FRONT REGIONAL NON-ATTAINMENT DESIGNATIONS

AREA	DESIGNATION	POLLUTANT
Salt Lake City	Maintenance Area	Carbon Monoxide (CO)
Ogden City	Maintenance Area	Carbon Monoxide (CO)
	Moderate Non-Attainment Area	Particulate Matter (PM_{10})
Salt Lake County	Moderate Non-Attainment Area	Particulate Matter (PM_{10})
Salt Lake (including Davis, Salt Lake, and portions of Weber, Box Elder, and Tooele Counties)	Moderate Non-Attainment Area	Particulate Matter ($PM_{2.5}$)

TABLE 8 - 14 MOBILE SOURCE EMISSION BUDGETS

AREA	POLLUTANT	YEARS	SIP BUDGET (tons/day)
Salt Lake City	CO	2019 - 2040	278.62
Ogden City	CO	2019	75.36
	CO	2021 - 2040	73.02
	PM_{10}*- NOx	2019 - 2040	6.92
	PM_{10} – Dust*	2019 - 2040	1.28
Salt Lake County	PM_{10} – NOx**	2019 - 2040	32.30
	PM_{10} – Dust	2019 - 2040	40.30
Salt Lake***	$PM_{2.5}$ – Nox	2019 - 2040	89.35
	$PM_{2.5}$ - VOC	2019 - 2040	53.55
	$PM_{2.5}$ – Direct Particulates	2019-2040	7.06

*Use "Build less than 1990" Test
**State air quality rules allows for a portion of the surplus primary PM10 budget (PM10 – Dust) to be applied to the PM10 secondary (PM10 – NOx) budget.
***Use "Build less than 2008" Test

of VMT, speed distribution of VMT, and highway facility type distribution of VMT, for each analysis year. Local data was prepared to determine the age distribution of the vehicle fleet using DMV data for 2014, and the vehicle type distribution using UDOT vehicle classification counts for 2014. Local emission inspection and maintenance programs for each county were also coded for input to the MOVES2014 model.

OVERALL MITIGATION

Organizations involved in transportation planning have been encouraged by federal agencies, such as the Federal Highway Administration, Federal Transit Administration and others to be more sensitive to environment needs and to incorporate principles of the National Environmental Policy Act into their planning processes. With this encouragement in mind, efforts were made during the WFRC's current planning process to put more emphasis on resolving environment issues, and to seriously consider NEPA principles. Possible impacts, many of which are required to be considered by NEPA, associated with the projects proposed in the 2015 – 2040 RTP have, in a general way, been identified. In addition, possible mitigation actions that could be taken if environmental impacts could not be avoided were also addressed. General guidelines are listed here to be used as projects are advanced in the project development process. (Note: A document prepared by the Southeast Michigan Council of Governments' entitled, "Integrating Environmental Issues in the Transportation Planning Process: Guidelines for Road and Transit Agencies," was used as a resource in the preparation of this section of the 2015 – 2040 RTP concerning mitigation of impacts.)

Federal transportation statues dictate a series of requirements for the regional transportation plan and Transportation Improvement Program. Current federal legislation contains a requirement that the RTP include "a discussion of types of activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. This discussion shall be developed in consultation with Federal, State, and tribal wildlife, land management, and regulatory agencies."

In essence, this process as applied to the Plan involves three-steps: (1) Defining and inventorying environmentally sensitive resources; (2) identifying and assessing likely impacts on these areas from RTP projects; and (3) addressing possible mitigation at the system-wide level. The process is designed to identify, early on, possible project impacts on environmentally sensitive resources and to provide this information to implementing agencies and elected officials for use in making transportation related decisions. The analysis was conducted on a regional level only. It was determined that the outcome of this analysis should alert the implementing agencies as projects are developed of environmental sensitivities and possible mitigation opportunities.

Mitigation measures can be identified in the planning process and are considered in the 2015 – 2040 RTP. However, consideration of how impacts that are unavoidable can be mitigated should be undertaken in "corridor studies" and in the environmental impact statement preparation phase of project development. Thus, the discussion of mitigation in this document is just the beginning of a relatively long process of identifying impacts and mitigation measures as transportation projects are developed.

Regardless of the type of project or the resources that may be impacted, sound guidelines need to be considered and followed during the planning, design, construction, and maintenance of transportation projects. Good planning practices need to be followed to ensure a blending of sound construction techniques with desired environmental protection goals. There are two types of guidelines that need to be addressed during the development and implementation phases of projects. These guidelines are for planning / design and construction / maintenance. For the purposes of this discussion, guidelines relating to planning and design are the focus, and are presented below. As for construction and maintenance guidelines, the AASHTO Center for Environmental Excellence's "Environmental Stewardship Practices, Procedures, and Policies for Highway Construction and Maintenance" should be referred to and is recommended for use in minimizing impacts of transportation projects.

PUBLIC COMMENTS AND INPUT ON DRAFT DOCUMENT

The Wasatch Front Regional Council has maintained a very robust public engagement effort for the draft 2015 – 2040 RTP at all stages of development. Thousands of comments were received on the draft plan over the four years of its update cycle which have been carefully documented and responded to by WFRC staff. Summaries of the comments and responses were made available to the members of the Regional Council prior to all decision

points on the draft 2015 – 2040 RTP.
Many comments were generic such as "we need more transit and more bicycle lanes". Many others, however, were directly related to individual projects. These comments were carefully considered and adjustments made to the draft RTP as warranted. Many projects within the adopted 2015 – 2040 RTP are very different compared to how they were initially considered in the draft stage because of the public comments received. The comments and responses received over the four year development of the RTP are included in this document as Appendix C, entitled "Public Involvement And Comment Summary."

Comments on the draft regional transportation plan were received at all stages of 2015 – 2040 RTP development including scoping, alternatives, financially unconstrained draft RTP, and final draft 2015 – 2040 RTP. Comments were solicited from the general public, interested stakeholders, city and county governments, special interest groups, UDOT, UTA, natural resource agencies and environmental justice organizations.

Comments were received during four official public comment periods and associated open houses, three series of small area meetings for city and county officials, multiple mass e-mailings to a broad cross section of interested stakeholders, and hundreds of other outreach efforts. These and all other public engagement efforts were documented in a log that is attached as Appendix C, entitled "Public Involvement And Comment Summary."

IMPLEMENT PLAN

Implement the plan through the cooperative effort of local, state and federal officials.

INTRODUCTION

To be effective, regional transportation planning must be a continuous process. The transportation system needs to be constantly monitored to determine its condition and operating efficiency. Short term measures to keep the system operating as effectively as possible must be pursued. Projects recommended in the 2015- 2040 RTP need to be refined and evaluated for environmental and social impacts. Funding sources to implement the recommendations must be identified and programmed. Finally, the RTP needs to be updated every few years to consider changing development patterns, new technologies, and evolving goals and vision for the Wasatch Front Region. This chapter will describe how the recommendations of the 2015- 2040 RTP will be implemented and what must be done to update it in the future.

IMPLEMENTATION STRATEGIES

Implementation of the 2015- 2040 RTP is a cooperative effort of local, state, and federal officials. The Wasatch Front Regional Council has established a process to continuously monitor on-going development and progress in implementing recommendations in the 2015 – 2040 RTP. The WFRC also works with other agencies to address short-range congestion, pavement preservation, and bridge replacement and rehabilitation needs through management systems. In addition, the WFRC helps conduct corridor and environmental studies for major highway and transit projects and assists local communities in master plan updates. These efforts help refine the recommendations in the 2015- 2040 RTP and encourage implementation.

Municipalities and counties of the Wasatch Front Region, UDOT, and UTA are responsible for implementing of the projects in the 2015- 2040 RTP. The WFRC works with these agencies to encourage them to pursue the facility capital improvements recommended in the 2015- 2040 RTP and incorporates Phase 1 projects into the short range Transportation Improvement Program (TIP). Each of the components of this continuous process is discussed in more detail in the sections that follow.

System Monitoring and Management Systems

The WFRC regularly publishes a Surveillance of Land Use and Socioeconomic Characteristics report, which includes current population and employment data for the Wasatch Front Region. The development and adoption of the Wasatch Front Urban Area's TIP each year allows the WFRC to monitor the implementation of recommended 2015- 2040 RTP projects and to reevaluate the needs of the Wasatch Front Urban Area. The Utah Department of Transportation's highway traffic surveillance data, published annually, along with periodic Utah Transit Authority ridership updates, also contribute information needed to update the 2015- 2040 RTP. In addition, as part of the continuing planning process, the WFRC and the Salt Lake- West Valley and Ogden- Layton Area Regional Growth Committee's Transportation Advisory Committees will continue to identify and respond to issues which impact the 2015 – 2040 RTP.

The 2015- 2040 RTP addresses the need to provide increased capacity to meet the growing travel demand in the Region. Because of financial and other constraints, the recommendations of the 2015- 2040 RTP will not meet all of the demand by the year 2040. Travel demand management and transportation system management strategies will be needed to mitigate some of the continuing traffic congestion anticipated in the future. In addition to meeting increasing travel requirements, the transportation system needs to be maintained and preserved in order to provide current users with safe and secure travel. The WFRC addresses these congestion, preservation, and safety needs through several management systems developed in cooperation with, UDOT, UTA, and others. Funding to pay for the recommendations of the management systems is included in the Financial Plan for the 2015- 2040 RTP.

Federal requirements found in MAP-21 mandates that a Congestion Management Process (CMP) be established in all Transportation Management Areas. Since October 1997, the WFRC has had fully operational CMPs for the

Salt Lake- West Valley and Ogden- Layton Urbanized Areas. The purpose of a CMP is to recommend actions to maximize the efficiency of the existing and future transportation system. The Salt Lake – West Valley and Ogden- Layton Area Technical Advisory Committees work with WFRC staff to refine and implement the CMPs. The committees monitor and provide input needed for implementation of congestion mitigation strategies on both a regional and a site-specific basis.

For all projects in the TIP that increase single occupant vehicle (SOV) capacity, the WFRC develops site-specific system management and demand management strategies that should be incorporated into each project. For all widening and new construction projects, the CMP also demonstrates that system management and demand management strategies, by themselves, will not meet the travel demand on a particular facility or, in other words, that additional SOV capacity is needed.

The Utah Department of Transportation uses a Pavement Management System and a Bridge Management System to develop recommendations for pavement and bridge projects to be included in the TIP. These systems identify the maintenance and preservation projects necessary to maintain the existing system, and are useful in recommending cost-effective and timely treatments. These recommendations are considered in the development of the TIP.

Safety and security are of increasing importance. The Utah Department of Transportation also has established procedures for identifying high hazard locations and selecting cost-effective projects for the use of federal safety funds. The Utah Transit Authority and UDOT are working with other state and federal agencies to address security needs.

REGIONAL TRANSPORTATION PLAN REFINEMENT

In addition to preparing the regional transportation plan, the WFRC works continuously with UDOT, UTA, and local communities on alternatives analyses, environmental studies, corridor studies, and master plan updates. These efforts help to refine the recommendations in the RTP and facilitate the implementation of the Plan. These studies help achieve several goals by: (1) better defining project scopes; (2) identifying needed rights-of-way for projects to allow UDOT, UTA, and local communities to pursue corridor preservation; and (3) identifying transit facility alignments and station locations. These efforts enable communities to begin planning for transit oriented development at specific locations to make the projects more competitive.

For many major highway and transit improvements, the WFRC, in cooperation with state and local engineers and planners, prepares an alternatives analysis or corridor study. The purpose of an analysis/study is to provide input when refining the long range transportation plan and to allow for decisions to be made on the scope of the improvement(s) during the planning process, prior to project development and engineering. Several major corridor studies and/or alternatives analyses have recently been completed or are currently underway in the Wasatch Front Urban Area, for both highway and transit corridors. Each of the corridors for which an alternatives analysis is underway, or for which a corridor study has recently been completed is discussed below.

Ogden - Weber State Environmental Study Report

The 2015- 2040 RTP shows a major transit investment (mode undetermined) on a placeholder alignment typical to Bus Rapid Transit (BRTIII) and Enhanced Bus (BRTI). A feasibility study and an alternatives review have been completed for the corridor. These studies narrowed the alignment to two alternatives and the transit modes to either Streetcar or Bus Rapid Transit (BRTIII) and Enhanced Bus (BRTI). An environmental assessment is underway and is anticipated to result in a Locally Preferred Alternative with both alignment and transit mode identified.

West Davis Corridor

SR 67 Highway (formerly the North Legacy Highway) from US-89/ Legacy Parkway/ I-15 in Davis County to I-15 in Weber County- The 2015- 2040 RTP recommends that a divided highway be constructed from US-89 / Legacy Parkway / I-15 to 4000 South in Weber County. An environmental study of this section began in 2010 and is still underway. At this time, the 2015- 2040 RTP recommends corridor preservation along the corridor identified in the 2009 Weber County North Legacy study. Efforts to preserve the corridor are being made by the affected municipalities, Davis County, Weber County, and UDOT.

Davis – Salt Lake Community Connector

The 2015- 2040 RTP recommends Bus Rapid Transit (BRTIII) and Enhanced Bus (BRTI) in the corridor recommended by the Alternatives Analysis. A feasibility study and an Alternatives Analysis have been completed

for this corridor. These studies have identified an initial alignment for the project, as well as its guideway and station characteristics.

1800 North Environmental Impact Statement

The 2015- 2040 RTP recommends the widening of 1800 North in northern Davis County from 2000 West to Main Street, a railroad overpass on 1800 North, and a new interchange on I-15 at 1800 North. An environmental study of this corridor and the potential interchange was initiated in 2010 and is nearing completion.

Southwest Salt Lake County Transit Feasibility Study

Riverton City, Herriman City, South Jordan City, Draper City, the Utah Transit Authority, and the Wasatch Front Regional Council sponsored a study which included Bluffdale City, Property Reserve Inc., Rio Tinto, Salt Lake County, and the Utah Department of Transportation as stakeholders. The purpose of the feasibility study was to identify a realistic and suitable high frequency / high-capacity transit project that could serve the communities in southwest Salt Lake County. The project would also connect the end of the Mid-Jordan TRAX line at the Daybreak Subdivision in South Jordan City to the FrontRunner Station in Draper. The Draper Extension, from the Draper FrontRunner station to the future Draper TRAX station at approximately 14800 South, was also studied. The 2015- 2040 RTP currently lists most of this project in the Unfunded Phase.

Taylorsville - Murray Environmental Study Report

An alternatives analysis and environmental assessment has been completed for this project. The 2015- 2040 RTP follows the locally preferred alternative identified by this study, which is a Bus Rapid Transit (BRTIII) and Enhanced Bus (BRTI) line from Murray to the Salt Lake Community College campus in Taylorsville.

Salt Lake City Streetcar

In late 2012, Salt Lake City and UTA constructed the Sugarhouse streetcar line (S Line) using federal funds. This project was built as an outcome of an Alternatives Analysis and environmental assessment. The 2015 - 2040 RTP envisions double tracking the existing line in keeping with the environmental assessment. It also anticipates line extensions resulting in a "C" shape route encompassing Westminster College, Sugarhouse Plaza, the Granary District, the Depot District, Downtown Salt Lake City, and the University of Utah Neighborhood. Alternative analyses have resulted in locally preferred alternatives for the segment from its current eastern end point to the Sugarhouse Plaza and the segment from the Depot District to 700 East and 100 South, east of Salt Lake City's Central Business District.

Mountain Accord Study

This study is taking a comprehensive look at the transportation, environmental, economic, and recreational needs along the Wasatch Mountain Range from I-80 to the southern end of Salt Lake and Summit Counties. Initial coping for the study has been completed and alternative scenarios are being evaluated.

5600 West Transit Environmental Assessment

The 2015- 2040 RTP recommends Bus Rapid Transit (BRTIII) in this corridor. This recommendation is consistent with the findings of the Mountain View Corridor Environmental Impact Study. The Federal Transit Authority has requested that an alternatives analysis and a supplemental environmental analysis be completed for this project. These analyses are underway.

Sandy/ South Jordan Circulator Study

This is an on-going study to assess the feasibility for near-term circulator solutions. Among other things, those conducting the study are looking at an exclusive travel lane, along with pedestrian / transit bridges over I-15 and State Street between the TRAX and FrontRunner lines. This option is included in the 2015 – 2040 RTP and would be constructed in conjunction with a State Street BRT. This corridor would be used by three different BRT lines as well as other transit facilities.

I-15 / FrontRunner Corridor Study

The 2015- 2040 RTP identifies improvements for the 3 to 4-mile wide I-15 / FrontRunner Corridor. The plan also identifies the need for additional projects to improve job access and maintain mobility. However, the WFRC, together with MAG, UDOT and UTA have identified the need for a more comprehensively study of this corridor from a multi-modal perspective and with more specificity than can be expected in an RTP analysis. The I-15/ Frontrunner Corridor Study will be initiated in 2015. This study, with a planning horizon of 2050, will identify additional long-range improvements for this corridor that will be included in the 2019- 2050 RTP.

TRANSPORTATION IMPROVEMENT PROGRAM

Continued funding is needed to implement the recommended highway and transit projects in the 2015 - 2040 RTP. The WFRC works with UDOT, UTA, and local communities through the Transportation Improvement Program (TIP) to allocate funding for RTP projects. The WFRC, as the MPO for the Salt Lake – West Valley and Ogden- Layton Urbanized Areas, is responsible for preparing and approving an annually updated TIP for the Wasatch Front Region. An MPO-approved TIP is required by federal legislation for a region to receive federal highway and transit funding. The purpose of the TIP is to create a coordinated list of transportation projects for which funding has been committed over a four-year period. The TIP should reflect the region's priorities, represent a consensus among state and regional officials, show a direct relationship to the regional transportation plan, be financially constrained, and conform with federal air quality regulations as they relate to transportation. Finally, the TIP must be subjected to thorough public review during its development and prior to adoption.

The WFRC prepares the TIP, in cooperation with UDOT and UTA, for all highways, transit, and other transportation related projects in the both Salt Lake – West Valley and Ogden- Layton Urban Areas. The WFRC, UDOT, and UTA have worked together to develop methods and procedures for evaluating, selecting and prioritizing projects to be included in the TIP. The WFRC has also developed policies to guide the approval of the TIP and the project selection process, as required by TEA-21 and reemphasized with MAP-21. The WFRC TIP includes fully-funded projects to be constructed over four years and project "concept development" that can be constructed in the following two years. Thus, an accurate forecast emerges of the major transportation infrastructure to be created within the Wasatch Front Region over the next six years.

The WFRC staff is continuously reviewing and identifying methods to improve the evaluation and ranking of projects eligible for the urban Surface Transportation Program (STP), the Congestion Mitigation / Air Quality (CMAQ) Program, and the Transportation Alternatives Program. Prioritization of urban STP projects considers system efficiency, benefits and costs, regional growth principles, congestion relief, safety needs, economic benefits, system preservation, environmental impacts, and system and demand management strategies. The prioritization process for CMAQ projects considers air quality benefits in terms of emission reductions, congestion relief, cost benefits, and length of effectiveness.

For other federal aid and state highway funds, a series of workshops are held annually in each UDOT Region to review the progress being made on projects in the current program and to identify projects to add to the program. In preparations for these workshops, each region holds a monthly Pavement Management or Roadway Management committee meeting to discuss the needs, concerns, and priorities of the roadway network throughout their region. Pavement preservation and maintenance needs, safety, traffic operations, and new capacity requirements are among the criteria UDOT uses to establish priorities. The WFRC participate at the meetings and provide the regions with information and local priorities for new capacity needs. UDOT's Programming Section and the Transportation Commission consider the recommendations of their regions in development of the programs.

The WFRC works with the UTA to identify transit projects for inclusion in the TIP. Projects are selected based on the priorities and needs established in the Transit Development Program and the Regional Transportation Plan. The WFRC also compiles lists of projects funded by local governments and includes them in the TIP. Once the TIP is compiled, the WFRC conducts an analysis to determine if the TIP conforms with state air quality plans. This conformity analysis is made available to the State Division of Air Quality and the public for review and comment. The FHWA and FTA must concur in a finding of conformance.

A draft TIP, containing the recommended programs and projects along with the conformity determination, is submitted to the Transportation Coordinating Committee of the Regional Council annually for its review. The county councils of governments also have an opportunity to review and comment on the draft TIP. Appropriate adjustments are made and a final TIP is developed. The final conforming TIP is then recommended to the WFRC for its approval. Following the Regional Council's approval, the executive director of UDOT, as the governor's designee, must review and approve the TIP. Following UDOT's approval, the Utah State Transportation Commission must include the Wasatch Front Regional Council's TIP without modification in the Statewide Transportation Improvement Program.

LOCAL PLANNING RESOURCE PROGRAM

The Local Planning Resource Program (LPRP) is an annual source of funding created, in partnership with Salt Lake County, for the purpose of providing jurisdictions located in the Salt Lake- West Valley and Ogden- Layton Urbanized Areas (municipalities, counties, townships, and multijurisdictional groups of local governments) with technical assistance to support planning efforts. Assistance is provided in the form of WFRC staff time for technical support or contract management, training for eligible applicants in the use of the Wasatch Choice for 2040 Toolbox or financial support for the hiring of private consultants.

Eligible projects include developing local comprehensive visions or plans, projects that involve multijurisdictional coordination, activities that help to implement previously-adopted plans such as revisions to ordinances or other land use regulations, public participation related to developing or implementing local plans, site assessments to determine feasibility of transit oriented development projects and/or studies or specific plans related to important local issues, such as housing or market studies. Applicants are also encouraged to utilize the following planning tools that were developed through the Wasatch Choice for 2040 Vision:

- Envision Tomorrow Plus (ET+)- a scenario planning software;
- Form Based Code Template- which provides a model code document and a manual for local government entities wishing to modify their local codes;
- Housing Opportunities Analysis- which helps local governments understand impediments and opportunities for housing equity;
- Implementing Centers Tool- with methods and strategies to finance transit oriented development infrastructure;
- StreetPlan- a web-based tool to visualize/test different street cross sections;
- ReConnect- the Wasatch Front Green Infrastructure Plan; and
- Envisioning Centers- a method to utilize the WC2040 toolbox in a dialogue with residents.

Significance of Program

The Local Planning Resource Program supports the Wasatch Front Region's planning goals by promotes consistent long range planning. The LPRP provides funding assistance and planning tools to local entities where such resources might not otherwise be readily available. Additionally, collaborative relationships have been formed with both local governments and planning agencies, such as the Utah Transit Authority, for projects related to transit oriented development. The program is structured in such a manner that applicants take ownership of the projects. The community begins to experience the values of the Wasatch Choice for 2040 and Toolbox and the need to support the regional vision. Momentum surrounding visional land use and transportation planning throughout the Region has been, and will continue to be, enhanced through this program.

Objectives And Goals

The Local Planning Resource Program aims to:

1. Support local governments in their efforts to create livable communities.
2. Support local outreach and engagement efforts that promote broader stakeholder involvement.
3. Reduce single-occupant vehicle travel demand and promote alternative travel choices through planning strategies.
4. Encourage coordination of land use plans with existing or planned regional transportation infrastructure.
5. Promote plans and projects that support and implement the following Wasatch Choice for 2040 Vision and Growth Principles.
    - Integrate local land use with regional transportation systems
    - Provide regional mobility through a variety of interconnected transportation choices
    - Provide public infrastructure that is efficient and adequately maintained
    - Provide housing for people in all various stages of life and income levels
    - Ensure public health and safety
    - Enhance the regional economy
    - Promote regional collaboration
    - Strengthen sense of community
    - Protect and enhance the environment
6. Support the use of the Wasatch Choice 2040 Toolbox (Envision Tomorrow Plus, Form Based Code, Housing Plans, Transit Oriented Development Financing, Complete Streets, Green Infrastructure, TravelWise, etc.) in local planning efforts.
7. Promote regional collaboration.

Financial Logistics

Through its Local Planning Resource Program, the Wasatch Front Regional Council has been able to annually provide $140,000 to serve the Ogden-Layton urbanized

area (including Davis, Weber, Morgan, Tooele and Southern Box Elder Counties) and $260,000 to Salt Lake County. Through a partnership with Salt Lake County, an additional a local match of $200,000 has been provided for 2014 and 2015. These amounts are proportionally distributed to each urbanized area according to its population total. Consistent with other WFRC programs, project applicants are required to provide a minimum 7% financial match. This minimum match requirement allows all sizes of communities to be able to compete regardless of municipal revenue flows. Applicants for the LPRP are carefully evaluated based on a number of criteria and funding is assigned.

FUTURE PLAN UPDATES

As noted above, transportation planning is a continuous process. Changing development patterns resulting from continued growth in the Wasatch Front Region, fluctuating economic conditions, and shifting energy and environmental concerns all impact transportation needs in the Wasatch Front Urbanized Areas and the types of improvements required to meet those needs. In order to keep the RTP current, the WFRC reviews the recommendations in the regional transportation plan at least every four years and updates it as necessary. The next update to the RTP will be presented to the Wasatch Front Regional Council in May 2019.

During the next four years, the WFRC will build upon the work completed in development of the current Regional Transportation Plan. This process will include continued emphasis on understanding land use-transportation relationships and using that information to refine the future vision for the Wasatch Front Region. The WFRC will monitor changing land use patterns and major new developments. Future financial projections will depend on the action of Congress, the Utah State Legislature, local officials and general public. As always, the WFRC continues to update its planning capabilities through improvements to the Region's travel models. Incorporating additional MAP-21 guidance into the planning process will be another area the WFRC will pursue more fully during the next four years. Finally, the Wasatch Front Regional Council will continue to update the process used to develop the RTP and anticipates addressing new issues in future updates.

Visioning

For this planning cycle, the Wasatch Front Regional Council utilized the adopted Wasatch Choice for 2040 as the basis for the scenario planning process. This, in turn, served as the first stage of the 2015- 2040 RTP process. Over the coming years, the Regional Council, in collaboration with key stakeholders, business representatives, and government officials and other interested parties will answer the question: what is the Vision for our region out to the year 2050. The State of Utah's multi-issue statewide visioning process, known as Your Utah- Your Future, will inform our Region's more detailed vision for how growth and transportation improvements should occur.

Changing Growth Patterns

This planning process assumes that the Wasatch Front Region will continue to grow, and the transportation system will need to address the consequences of this growth. Over the next few years, the new development and redevelopment that takes place will need to be considered in future plans. Among the factors that will have the greatest impact are the redevelopment of downtown Ogden, to promote employment and residential uses, the expansion at the Business Depot Ogden, implementation of plans for commercial and office development on the west side of Hill Air Force Base, the creation of Weber State University's Davis County Campus in Layton / Clearfield, redevelopment in downtown Salt Lake City, and realization of Kennecott Land Company's planned development on the west side of Salt Lake County. In addition to these activities, new development is likely to occur around the light rail and commuter rail transit stations in the Region.

Funding Sources

The WFRC will continue to monitor funding sources available for transportation improvements. Over the past several years, the Utah Legislature has significantly increased state funding for highway improvements. In addition, the Legislature has authorized new local option sales taxes and increases in vehicle registration fees for highway, transit, and airport improvements. These funds can be used for congestion mitigation, new capacity, and corridor preservation.

With the adoption of the 2015- 2040 RTP, members of the Wasatch Front Regional Council will work to ensure that state and federal lawmakers are fully aware that a significant need still exists for preserving and expanding the Wasatch Front Region's transportation system. The WFRC will also work with state and federal officials to pursue new, as well as increases in existing funding sources for highway and transit projects.

Travel Demand Modeling

The WFRC uses travel forecasting models to project future highway traffic and transit ridership based on proposed transportation networks and forecasted land use characteristics. These travel forecasts are used to identify needed highway and transit improvements. These models are data intensive, and are refined each RTP cycle based on the latest traffic counts, speeds, transit boardings, and travel behaviors. Coordination between the land use model and the travel demand model is a critical link in the forecasting process. For the next RTP update, the WFRC will be using a new real estate market model to better inform land use and transportation interactions. With the assistance of consultants, the WFRC has prepared comprehensive data sets and calibrated this robust model that will improve the technical analysis informing the RTP.

NEPA and Planning

By addressing National Environmental Protection Act issues during the planning process, the WFRC hopes to streamline project development for project sponsors. To address inherent issues, the WFRC has made a greater effort to identify and evaluate multi-modal alternatives in major transportation corridors, increase public involvement opportunities, address environmental factors in the evaluation process, and prepare a draft purpose and need statement that can be used as a basis for the preparation of the necessary environmental studies.